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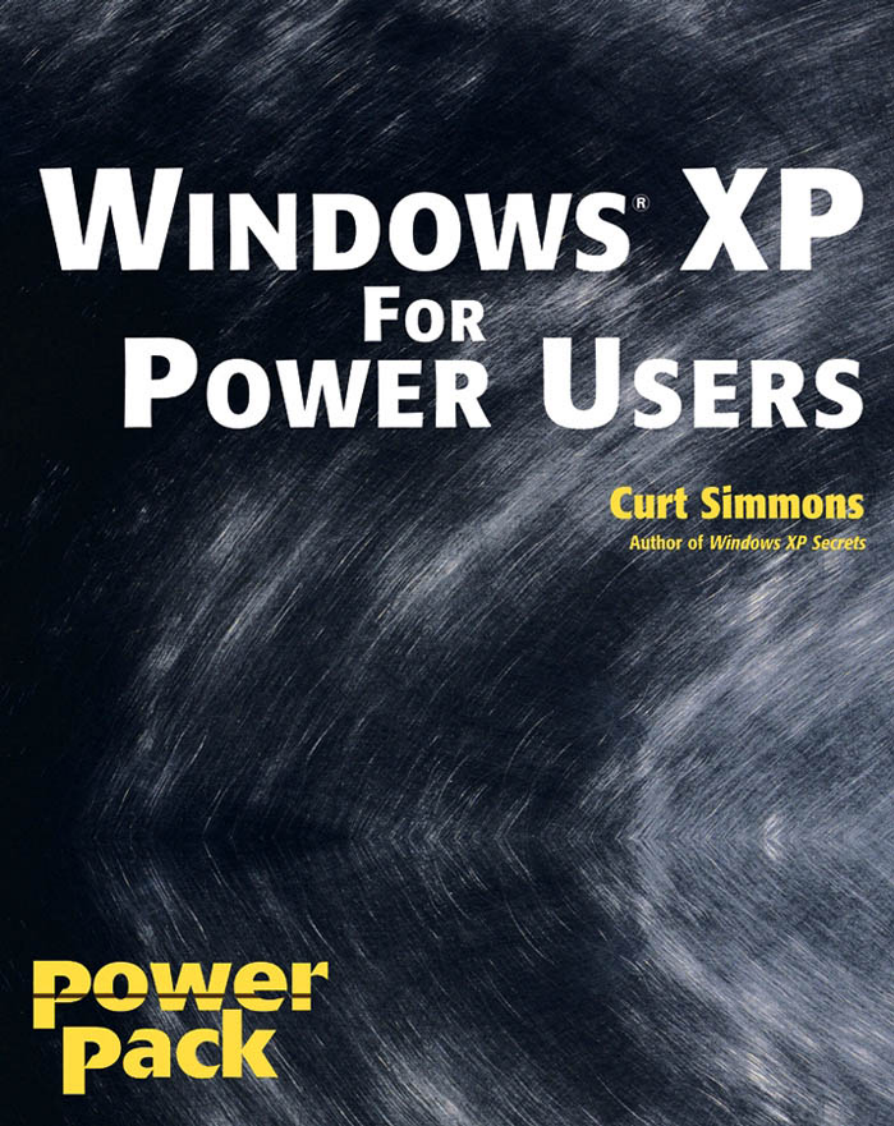
WINDOWS® XP
FOR
POWER USERS
Curt Simmons
Author of Windows XP Secrets
Power
Pack

Windows® XP for Power Users: Power Pack

Curt Simmons

Wiley Publishing, Inc.

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Preface

Welcome to *Windows XP for Power Users: Power Pack*, the book for the power user like yourself. Since the early days of Windows XP's release, the operating system has received a lot of praise, as well as a lot of complaints. No doubt, Windows XP is the best version of Windows that Microsoft has produced to date. It does more, works better, and is more versatile than any previous versions of Windows. With its millions of lines of code, however, Windows XP is certainly not perfect. It has its share of problems and aggravations, many of which have to do with hardware and application compatibility.

Overall, though, I believe Windows XP is a great operating system and it works great if you give it the right resources and hardware and/or software that are developed for this new breed of operating system. As a power user, you want to do more with Windows XP. You want to get more from the operating system features and functions, and you want to be able to control the system and customize it to meet your needs. Look no further; this book is written specifically with you in mind.

In these pages, you'll see how to do some helpful tasks as well as many lesser-known tasks that you will find useful as you work with Windows XP. You'll see how to manage the interface, work with hardware and software, configure operating system services, manage users, create a home network, manage security features, and much, much more. I don't cover common, everyday tasks that you already know how to do, but I'll show you how to use the features you want to learn about, and I'll show you how to use them to the best of your advantage.

This book is written on a topic-by-topic basis. Each chapter stands on its own, so you can read the book from cover to cover, or you can skip around and find the information you need. The choice is completely up to you.

Along the way, you'll find some sidebars and other icon material. The sidebars are extra items. You don't have to read them, but they all contain good information you may find helpful, so I encourage you to check them out. Also, the icons you'll see along the way show you how to do something more easily or how to avoid a common problem.

I hope you enjoy the book! Feel free to visit me on the Internet or drop me an e-mail. I look forward to hearing from you.

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Icons to Watch For

The following icons indicate special information throughout each session:

These icons indicate special information relating to the current section that you may find useful.

These icons indicate information that tells you the best way to do something or alert you to special considerations you should be aware of when performing a routine task.

This icon indicates a reference to related information in another session.

This icon indicates cautionary information, alerting you to potential hazards encountered within the tasks at hand.

Acknowledgments

I would like to thank everyone at Wiley for the opportunity to write this book. A special thanks goes to Katie Feltman and Marcia Ellett for working with me on this project. I would also like to thank Felicia Robinson and Maggie Warren for their eagle eye and attention to detail. Finally, thanks to my family for their constant support.

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Chapter 1

Configuring the Windows XP Interface

IN THIS CHAPTER

- Configuring the Start menu
- Configuring the taskbar
- Managing the Recycle Bin
- Managing the Control Panel appearance
- Managing the Display

AT FIRST GLANCE, THE Windows XP interface is radically different than the typical Windows interface used in the past. In fact, the first boot of Windows XP often leaves new users a bit shocked when they see a virtually empty desktop. The good news is the sleek Windows XP interface is easy to use, and it provides you with plenty of configuration options so that you can make Windows XP look just the way you want. This first chapter takes a look at the Windows XP interface. It shows you how to configure all of the interface items and features so that Windows XP meets your needs.

Configuring the Start Menu

The Windows XP Start menu is a bit different than the Start menu found in previous versions of Windows. The Start menu still provides you with access to different programs and portions of Windows XP, and its goal has not changed. The purpose of the Start menu is to . . . well . . . start something. It provides you with access to documents and programs, but also operating system features and easy access to the things you use most of the time.

The Start menu in Windows XP provides you with a two-column design, shown in Figure 1-1. At the top of the Start menu, you see your username and photo icon configured for use with your username. In the left column, you see access to several programs, and the right column gives you access to files and other portions of the operating system.

For more information on configuring the photo icon for use with your username, refer to Chapter 2.

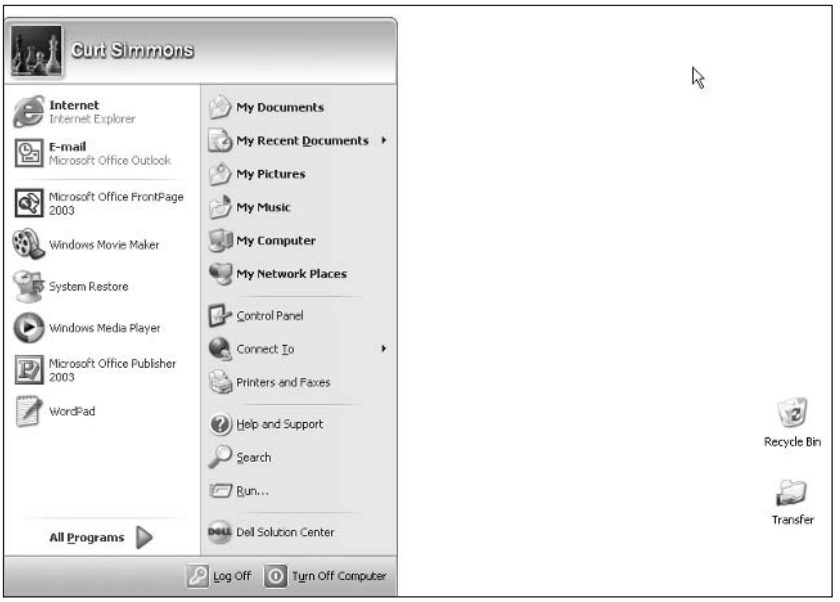

Figure 1-1: The Start menu gives you access to commonly used items.

The left side of the Start menu lists programs you commonly access. By default, Internet Explorer and your default e-mail client always appear in this list. The rest of the programs appear here according to your actions. For example, if you open Microsoft Word, the application icon is added to the Start menu for easy access. If you do not use Word again for a long period of time, it is dropped from the Start menu due to inactivity. So, the Windows XP Start menu is rather dynamic in that it tries to guess what programs you might need by keeping frequently used programs available on the Start menu for you.

I mentioned that Internet Explorer and your default e-mail client are always listed on the Start menu. What happens if you don't use these for a period of time? Nothing. Internet Explorer and your default e-mail client are pinned to the Start menu by default, which means they are permanently placed there unless you decide

to remove them. You can pin any application or document to the Start menu so that it is always available to you. To pin an item to the Start menu, right-click the item in the left column and click Pin to Start menu. You can also remove a pinned application or document by right-clicking the icon on the Start menu and clicking Unpin from Start menu, as shown in Figure 1-2.

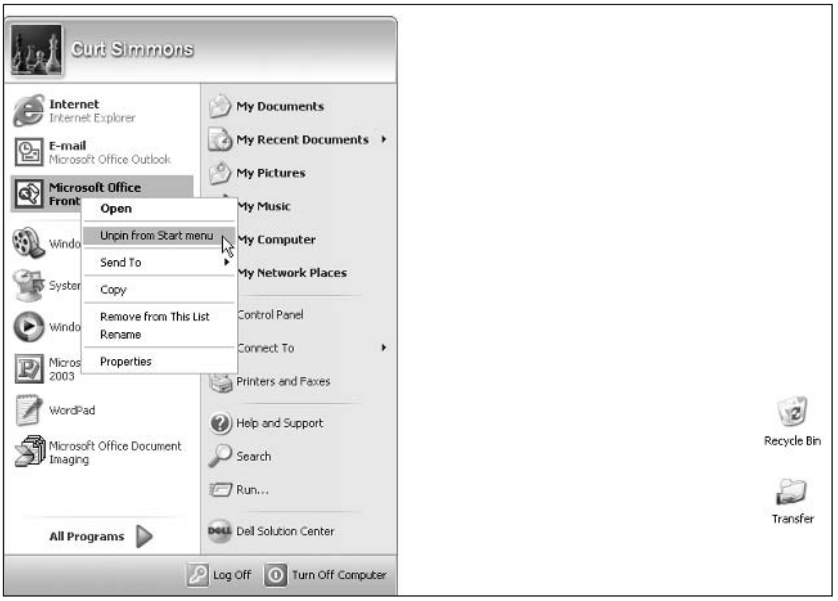

Figure 1-2: You can pin or unpin items simply by right-clicking.

Notice the small divider bar that appears on the left side of the Start menu, as shown in Figure 1-1. This bar divides pinned and unpinned Start menu items so you can easily keep track of what is pinned and what is not. Also, Internet Explorer and your default e-mail client have some quick access options when you right-click their icons. You can quickly browse the Internet or check e-mail this way.

On the right side of the Start menu, you see common Windows items that you will need to access, including the following:

- **My Documents, My Pictures, and My Music** – The My Documents folder is the default storage location for files of all kinds, including pictures, music, and movies. My Documents contains the following default subfolders:
  - My Music
  - My Pictures
  - My Videos
  - Remote Desktops
- **My Computer** – My Computer is the default folder that stores information about drives connected to your computer. You can quickly access System properties by right-clicking My Computer on the Start menu and clicking Properties.
- **My Network Places** – My Network Places contains information about other computers and shared folders on your network. You can learn more about My Network Places in Chapter 8.
- **Control Panel** – Control Panel is the default location for managing all kinds of programs and services on your XP computer. Control Panel configuration is explored later in this chapter.
- **Network Connections/Connect To** – Network Connections is a folder that contains your dial-up and/or broadband connections, as well as local area network (LAN) connections. If you have configured connections, you'll see a Connect To option where you can quickly access and start a connection.
- **Help and Support** – Windows XP includes a help and support feature that can answer your questions and even locate answers on the Internet.
- **Search** – The Search feature enables you to find items on your computer or items on the Internet.
- **Run** – You can use the Run dialog box to quickly start programs or connect to network shares.
- **Log Off/Turn Off Computer** – These standard icons enable you to log off, shut down, or restart the computer.

You can add just about anything to your Start menu by simply dragging the icon to the Start menu. Also, notice that the items on the right side of the Start menu can't be removed by right-clicking them. However, you can manage what is on the Start menu by accessing Taskbar and Start Menu Properties. To further configure the Start menu, just right-click an empty area of the taskbar and click Properties, or right-click the Start menu button and click Properties. The Properties dialog box appears with Taskbar and Start Menu tabs, as shown in Figure 1-3.

Figure 1-3: Taskbar and Start Menu Properties.

You have the option on the Start Menu Properties page to use either the current Start menu, or the Classic Start menu, which is simply the Start menu found in previous versions of Windows. Because the two are different, the following two sections explore the configuration of each.

XP Start Menu

To continue using the XP Start menu, click the Customize button. This takes you to a Customize Start Menu window where there is a General and Advanced tab. On the General tab, shown in Figure 1-4, there are three different customization options:

- **Icon size** – You can choose to use large or small icons in the Start menu. Small icons may be harder to see, but you can put more shortcut icons directly on the Start menu. Large icons are selected by default.
- **Programs** – By default, your Start menu will make five program shortcut icons appear in viewing range when you click Start. You can change this number by using the drop-down menu. The Start menu can display up to 30 shortcut icons. Basically, this customization option makes your Start menu larger to accommodate all of the 30 programs you can place on it.
- **Show on Start menu** – This option allows you to show Internet and e-mail on the Start menu, and then provides a drop-down menu to select the application (Internet Explorer and Outlook Express by default). If you have other browser or e-mail clients installed on your computer, you can use the drop-down menu and select a different browser and/or e-mail client, or just clear the check boxes if you don't want these items displayed at all.

Figure 1-4: General tab.

On the Advanced tab, you have some additional options that you may find useful, as shown in Figure 1-5.

Customize Start Menu
General
Advanced
Start menu settings
Open submenus when I pause on them with my mouse
Highlight newly installed programs
Start menu items:
Control Panel
Display as a link
Display as a menu
Don't display this item
Enable dragging and dropping
Favorites menu
Recent documents
Select this option to provide quick access to the documents you opened most recently. Clearing this list does not delete the documents.
List my most recently opened documents
Clear List
OK
Cancel

Figure 1-5: Advanced tab.

First, you see two check boxes collectively called Start menu settings:

- **Open submenus when I pause on them with my mouse** – By default, folders such as My Documents, My Computer, and so on are stored as a link on the Start menu. You can click them to open the folders in a different window. However, you can use a menu option so that a menu appears where you can choose subfolders. For example, say you have a folder called Work in the My Documents folder. Without using the menu option, you have to click My Documents, and then open Work. Using the menu option, if you point to My Documents on the Start menu, a pop-out menu appears showing your other folders, including Work, and you can just click on Work to directly open it. This check box simply asks you if you want the pop-out menu to appear when you put your mouse over the item, or if you want to have to click the item to see the pop-out menu.
- **Highlight Newly Installed Programs** – When applications are installed on your XP computer, they are highlighted until you use them for the first time. This serves as a simple reminder that you have new stuff you haven't used. Just clear the check box if you don't want to use the feature.

The second part of the Advanced tab gives you a scroll window where you can select the folder and Windows items that appear on the Start menu and choose how those items are displayed. For example, by default, Control Panel is shown on the Start menu as a link. You can change this behavior so that it is shown as a menu, or not all. Simply scroll through the list and click the desired check boxes and radio buttons to determine what Windows items you want to include and how those items are presented (link or menu). You may want to experiment with these settings until you find the combination that is right for you; remember, you can make changes to these settings as many times as you like.

The last part of this configuration window allows you to show recently used documents on the Start menu. For example, say that you're writing your life story. Once you open the document and then close it, the Start menu will put it in Recent Documents, which is a folder that will now appear on the Start menu. You can easily access the document from the Start menu the next time you need it.

Classic Start Menu

You can use the Classic Start Menu by selecting the Classic Start Menu option on the Start menu tab of Taskbar and Start Menu Properties. This option allows you to use the Start menu that was seen in previous versions of Windows. If you want to use the Classic Start Menu, select the Radio button and click the Advanced button, which gives you a single Customize Classic Start Menu interface, as seen in Figure 1-6.

Figure 1-6: Classic Start Menu option.

You'll see that you have the same basic Start menu options, just in a different format. If you want to add items to the Classic Start Menu, click the Add button and a wizard will help you select items on your computer to add. Use the Remove button to remove items, and use the Advanced button to open Windows Explorer so you can manually add and remove items. You can also resort the items and clear recent documents, programs, Web sites, and so on. The Advanced window option that you see enables you to display a number of Windows items, use expandable (menu) folders, and so on. These items are self-explanatory; again, feel free to experiment and try new configurations.

Configuring the Taskbar

The taskbar is the handy bar that runs along the bottom of your screen. Minimized programs, along with the Notification Area and Quick Launch (if you choose to display it) are found on the taskbar. You have a few quick customization options, which you can access by opening Taskbar and Start Menu Properties, then clicking the Taskbar tab, shown in Figure 1-7. In the Taskbar appearance area, you have a few check box options that enable certain features:

- **Lock the taskbar** – You can drag the taskbar to different places on your desktop. For example, if you want the taskbar at the top of the screen instead of on the bottom, just drag it to the top. If you use the Lock the taskbar check box, the taskbar will be locked on the bottom of the screen and you will not be able to move it.

- **Auto-hide the taskbar** – This feature keeps the taskbar out of your way. When you are not using the taskbar, it disappears below your screen view. When you need it, just point your mouse to the location of the taskbar and it will reappear.
- **Keep the taskbar on top of other windows** – As you are using various windows, they may cover up portions of the taskbar. This setting always keeps the taskbar on top.
- **Group similar taskbar buttons** – This feature keeps similar items together. For example, if you open two Web pages, then minimize both, they will appear next to each other on the taskbar.

The Notification area, formerly called the System Tray, is the small icon area on the right side of your taskbar. It tells you a number of functions that are working on your computer and can notify you of certain application functions. You have two simple check box options here. You can choose to show the clock in the System Tray, and you can choose to hide inactive icons. The Hide inactive icons feature simply cleans up the System Tray area so that only active icons are seen. You can try both of these settings to see if you like them.

Figure 1-7: Taskbar properties.

You can make some additional changes to the interface using the Microsoft PowerToy — TweakUI — which is available for free download. See Chapter 20 for details.

Managing the Recycle Bin

By default, Windows XP provides you with only one desktop icon, the Recycle Bin. The Recycle Bin is the catch-all location for files, applications, and other items you no longer need. This primarily includes files, but you can also drag zipped files and other kinds of information into the Recycle Bin. The Recycle Bin doesn't actually delete the items from your system until you choose to empty the Recycle Bin or the Recycle Bin starts to become full. Only then is the item deleted forever.

You can open the Recycle Bin and see what is inside by double-clicking the Recycle Bin icon on your desktop (you can also right-click the icon and click Explore). You can see the items in the Recycle Bin that are waiting to be deleted, as in Figure 1-8. In the View menu, you can select thumbnails, tiles, icons, list, or details. With these choices, you can see large icons, small icons, a list of files, or even a detailed list telling you the item's original location and the date it was moved to the Recycle Bin.

Figure 1-8: Recycle Bin contents.

You see that you have two buttons available in the Recycle Bin Tasks pane, found on the left side of the Recycle Bin. Click the Empty the Recycle Bin icon to permanently delete the items in the Recycle Bin from your computer. You can also empty the contents of your Recycle Bin by simply right-clicking the Recycle Bin icon on your desktop and clicking Empty Recycle Bin on the menu that appears. You *cannot* recover these items after they have been emptied from the Recycle Bin.

You also have a Restore all items icon in the Recycle Bin Tasks pane. Use this button to move the file back to its original location on your computer. What if you have 30 files you have deleted and you want to restore only one of them? No problem—just select the file in the list by clicking it. The Restore all items icon

changes to a Restore this item icon. Click the icon and the file is put back in its original location. You can also move an item out of the Recycle Bin by just dragging it to the desktop. The item will now reside on your desktop.

You can't open an item that is held in the Recycle Bin. For example, if you have a file named 05421.doc and you're not sure what the file is, you'll have to either restore it or drag it to the desktop before you can open and read it.

You can also change the Recycle Bin's properties, which basically changes the way it behaves. Right-click the Recycle Bin on your desktop and click Properties on the contextual menu that appears. A Recycle Bin Properties window appears that has Global and Local Disk tabs, as shown in Figure 1-9.

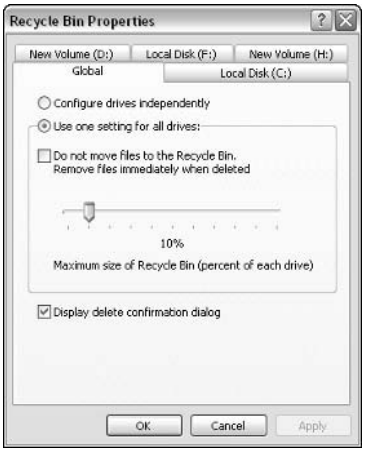

Figure 1-9: Recycle Bin Properties.

You see two radio buttons that enable you to either configure your drives independently or use the same settings for all drives. This feature applies to you only if you have more than one hard disk in your computer. In most cases, the default setting that configures all of your drives the same way is all you need. Next, you see a check box that tells your computer to delete items immediately instead of moving them to the Recycle Bin. As you can guess, this feature automatically deletes items when you click Delete. This provides you with absolutely no protection in the event that you accidentally delete a file you want. I strongly recommend that you do not click this check box to enable this option. No matter how good your computing skills, you will make a mistake from time to time and accidentally delete something. The Recycle Bin is your safety net.

Next, you see a sliding bar that represents the maximum size the Recycle Bin can grow. Like everything else on your computer, the Recycle Bin stores items in a folder on your hard drive. The sliding bar enables you to set a limit for how big the Recycle Bin can grow before it forces you to empty the contents and permanently delete items from your system. By default, this setting is configured for 10 percent. This means that 10 percent of your hard drive's space can be used before the Recycle Bin tells you to empty it. Under most circumstances, this 10 percent setting is all you need, but you can change it to a higher or lower percentage if you want. Keep in mind that you do not have to wait until your Recycle Bin is full to empty it. Some people empty it every time they put documents in it, while others empty it on a weekly basis after they have reviewed its contents to make sure nothing was accidentally deleted. There is no right or wrong approach; just find what works best for you.

Finally, you see a Display delete confirmation dialog check box at the bottom of the Global tab. This tells Windows to give you that aggravating Are You Sure? message every time you delete something. This option is selected by default, and although the configuration message is sometimes a pain, it is a good safety check.

Aside from the Global tab, you have a Local Disk tab — you may have several of these tabs if your computer has more than one hard drive. You can't do anything on these tabs if you selected the Use one setting for all drives radio button on the Global tab. If you want each drive to have different settings and you selected this option on the Global tab, you can configure each drive independently. The tabs have the same options, such as the slider bar for the percentage of the hard drive you want to use for the Recycle Bin.

Managing Control Panel Appearance

The Windows XP Control Panel provides a different look than previous versions of Windows, and not exactly to the joy of some power users. The default XP Control Panel, shown in Figure 1-10, uses a category view, where Control Panel features are organized by different categories. After you click a category, you are given a number of task options that you can complete. The reason Microsoft created the category-based Control Panel was to make life easier on users. With the category view, users can more quickly find what they need to do, rather than having to understand the various Control Panel icons. You are free to use the category view if you like, but I find it is a bit tedious for most power users. You end up wading through categories and lists of tasks, rather than quickly accessing the Control Panel applet you need. Never fear, however; you can go back to the classic Control Panel view by simply clicking Switch to Classic View in the Control Panel task list, as you can see in Figure 1-10. This simple switch makes the Control Panel look like the classic Control Panel you saw in Windows 2000 and earlier systems so that you can more quickly access applet options.

Figure 1-10: Category view Control Panel.

Managing the Display

If you access Display Properties in Control Panel (use Classic View) or simply right-click an empty area of your desktop and click Properties, you can access the properties pages that determine the display settings and overall appearance you see on your monitor. A number of different options here allow you to configure Windows XP to look and feel the way you want; the following sections explore the configuration options available to you on each tab.

Themes

A theme is a group of settings that are applied to Windows XP under a single name. The settings usually relate to each other, creating a theme of some kind. Themes became very popular in Windows 98, and Windows XP now provides a Themes tab (shown in Figure 1-11) in Display Properties. The themes option is placed here in Windows XP because the default Windows XP interface is simply a theme.

You can use the XP interface, or you can change to a different theme, or even use a Windows Classic theme, which basically gives you the plain Windows interface you saw in Windows 9*x*, Me, and 2000. Simply use the drop-down menu to select a desired theme and click Apply to see all of the settings the theme has to offer. You can also modify any theme (including the default XP interface theme) by making changes to the other tabs available in Display Properties.

If you want to use additional Windows themes from previous versions of Windows, such as Aquarium, Space, and so forth, you can purchase and install the Plus! Pack for Windows XP, available at local and Internet computer stores.

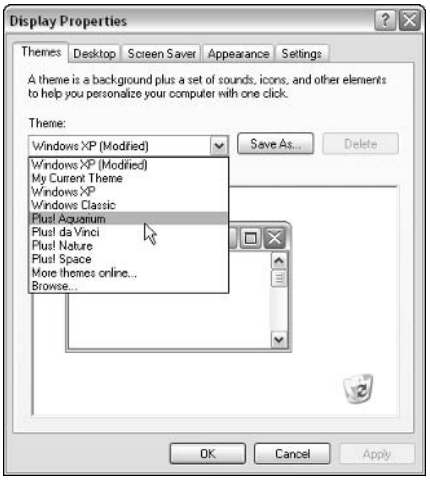

Figure 1–11: Themes tab.

Desktop

The Desktop tab, shown in Figure 1-12, gives you the option to configure the Windows XP desktop area with pictures, graphics, background colors, and even different texture appearances. Windows XP gives you several built-in options that you can choose for your background in the list on the Desktop tab. If you scroll through the list, you see that there are two kinds of files present. Some files give your desktop a pattern while others give your desktop a picture.

Figure 1–12: Desktop.

If you look in the provided list on the Desktop tab, you see that each file has a name and an icon picture next to it. Background patterns and pictures are simply JPEG, BMP, GIF, and related picture file formats that you commonly see on the Internet, as well as HyperText Markup Language (HTML) files. On the Desktop tab, you can select one of the files and it will appear in the test monitor window on the Background tab. By default, pictures are set up to stretch across your screen so that they take up the entire desktop area, and patterns are set to tile so that they repeat until the entire desktop area is used. This causes the pattern to fill the entire test screen so you can see how it looks before you decide to use it. You can also use the Center option in the drop-down menu to center the pattern in the middle of the test screen, which will give you a different look. If you like what you have selected, click the Apply button at the bottom of the window and the new pattern will be applied to your desktop. If you don't like it, just pick something else on the Desktop tab. You can look at all of the patterns and even reapply different patterns until you find the one you want.

If you choose to center a picture or pattern, you'll have an area of your desktop still showing. Windows XP enables you to alter the remaining desktop area to your preference by using a color. For example, say you choose a wallpaper from the list on the Background tab and you center the picture. You will have additional leftover background space. You can use the color drop-down menu and select a color for the remaining portion of the desktop area. After you have finished your background pattern and selected anything else from the Background tab you want to use for the main pattern, just click Apply and click OK.

You can also find a Customize Desktop button toward the bottom of the Desktop tab. If you click this button, you are taken to the Desktop Items properties page, which contains General and Web tabs. On the General tab, shown in Figure 1-13, you can choose which desktop icons you want to display, such as My Documents, My Computer, My Network Places, and Internet Explorer. None of these items are selected by default, but you can add them to your desktop by selecting them if you like. You'll also see a window showing the default icons that are used for each of these items. If you want to use different icons, just click the Change Icon button and select different icons from the provided list.

At the bottom of the tab is the option to use the Desktop Cleanup Wizard. The cleanup wizard is configured to run every 60 days by default, but you can run it at any other time by clicking the Clean Desktop Now button. This wizard simply removes old shortcuts and puts them in a folder called Unused Shortcuts. If you create a lot of shortcuts and don't use them very often, this wizard can help keep your desktop free of clutter. Otherwise, it can remove items you intend to keep, so you may choose not to use it.

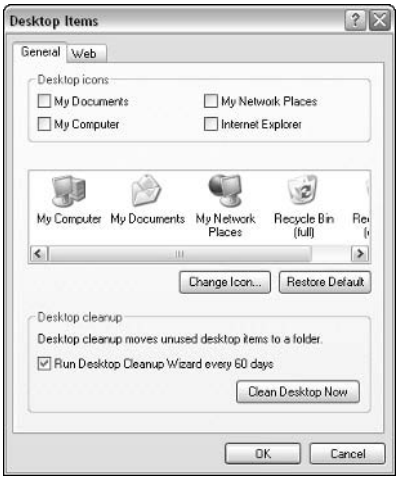

Figure 1-13: Desktop Items, General tab.

The Desktop Items Web tab, shown in Figure 1-14, allows you to place a complete Web page on your desktop. You can use the wallpaper feature to place an HTML file on your desktop, but if you choose the Web option, you can place an actual Web page there that can be synchronized with the real Web page on the Internet.

Desktop Items
General
Web
To display a Web page on your desktop, select it from the following list. To add a Web page to the list, click New. To update Web page content, click Synchronize.
Web pages:
My Current Home Page
New...
Delete
Properties
Synchronize
To prevent moving or resizing of Web items on your desktop, select the following check box.
Lock desktop items
OK
Cancel

Figure 1-14: Desktop Items, Web tab.

To place a Web page on your desktop, click the New button and enter the URL in the New Desktop Item dialog box, as shown in Figure 1-15. You'll need an Internet connection to complete the addition of the Web page.

New Desktop Item
You can add live Web content or pictures to your desktop.
To add an item from the Microsoft Desktop Gallery, click Visit Gallery.
Visit Gallery
To add a Web page or picture from the Internet, enter its Web address (URL) below.
Location:
www.curtsimmons.com
To add a picture or HTML document, click Browse.
Browse...
OK
Cancel

Figure 1-15: Enter the URL.

After you click OK, a confirmation message appears. If the Web site requires you to enter a password, click the Customize button and enter it; otherwise, just click OK. When you choose the Web page option, the entire Web site is downloaded and stored on your computer so that you can use the site, just as if you are actually using a browser. If you later want to remove the Web page from your desktop, just return to the Web tab and clear the check box next to the Web page in the Web Pages dialog box.

Screen Saver

The Screen Saver tab provides two functions (see Figure 1-16): It enables you to configure a screen saver for your computer and to configure power management options. A screen saver is a simple program that runs after your computer has been idle for a certain period of time. In the past, the screen saver protected monitors from screen burn. When a monitor was left unattended for too long and one continuous picture or window was displayed, the image could burn itself onto the monitor and always be sort of floating in the background. Monitors today aren't really susceptible to this problem, so screen savers are more for decoration purposes. Use the Screen Saver drop-down menu to select the screen saver you want. You can see a preview in the test monitor on the tab, or click the Preview button to see a full-screen option. You can also click the Settings button (see Figure 1-17) to see what configurable options there are for the screen saver. Typically, you can use the Settings option to speed up a screen saver or slow it down.

To find out more about the Power configuration options, refer to Chapter 5.

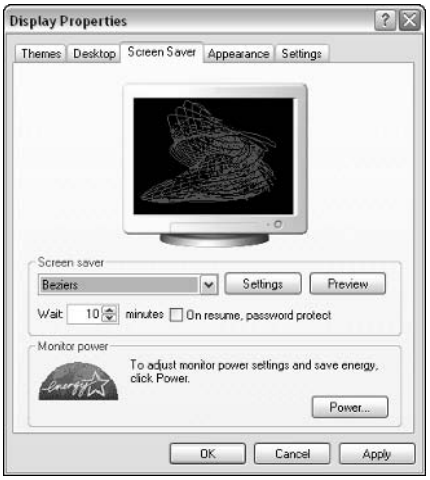

Figure 1-16: Screen Saver tab.

Figure 1-17: Use the Settings option to customize your slideshow.

Appearance

The Appearance tab, shown in Figure 1-18, enables you to configure specific options on Windows XP, including color schemes, font sizes, and effects. Basically, this feature allows you to customize the Windows XP theme, or any other theme you choose to use.

My Pictures Screen Saver

The My Pictures Screen Saver Options dialog box uses the photos found in the My Pictures folder to create a slideshow screen saver. This is a fun way to personalize Windows XP. You have some helpful customization options with the slideshow itself. If you select My Pictures from the screen saver drop-down menu, you can click the Settings button and configure how often the pictures should change, how big the pictures should be, as well as some additional options that allow you to stretch photos, use transitions, and so forth. Also, you can use the Browse button to select a desired folder to use, rather than My Pictures. This way, if you have photos stored in individual folders, you can simply use those folders for the screen saver slideshow, rather than having to move everything to My Pictures.

Figure 1-18: Appearance tab.

You have a few standard options here, which are explained in the following list:

- **Windows and Buttons** – You can use the drop-down menu to either choose XP style or Windows Classic style.
- **Color Scheme** – A number of color schemes are available. Use this drop-down menu to select one you like. You can experiment with this setting and change it at any time.
- **Font Size** – You can choose Normal, Large, or Extra Large from the drop-down menu.

- **Effects** – Click the Effects button to open the Effects window, which gives you some basic check box options such as fade, shadows under menus, and so on.
- **Advanced** – If you click the Advanced button, you can make specific font and color changes to different Windows components, such as menus, buttons, active title bar, and a host of others. Under most circumstances, you will not want to edit all of the settings, but if you want to change something specific, just select it using the drop-down menu and configure the available options for it.

Settings

The final Display Properties tab is the Settings tab. You use this tab to manage the actual video card hardware that resides within your computer, and you have a few basic options, as shown in Figure 1-19. First, you see a Color quality drop-down menu. This menu enables you to select the number of colors Windows XP can use to generate all of the graphics and pictures that appear on your monitor. True Color (24-bit) is the highest color scheme that you can use, and, depending on the quality of your video card, you may have only a few color options available. The higher resolution provides the best color performance.

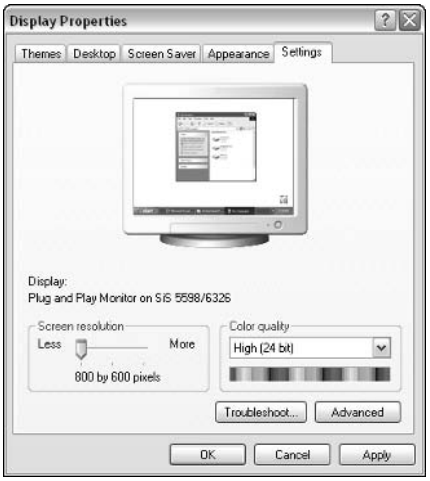

Figure 1-19: Settings tab.

You also see a Screen resolution slider bar. You can adjust the screen area to suit your needs, and as you adjust it, you will see that your desktop area gets either larger or smaller (including your icons), depending on what option you select. The best setting is generally 800 × 600.

You also have an Advanced button. This option opens the properties pages for your video card. The default settings are generally all you need, but a few options can help solve particular problems. Click the button, and you will see a new window with additional tabs.

On the General tab, you can change the Dots Per Inch (DPI) setting, which is typically set around 96, by default. Increasing this value can increase the size of the items found on the screen. However, this setting increases all items. If you only want to change the font size, use the Appearance tab in the Display Properties dialog box.

On the Monitor tab, you can adjust the screen refresh rate. If the screen seems to respond slowly to keyboard strokes, increasing this rate may improve performance, depending on the quality of your monitor. Again, as a general rule, the default setting is best.

On the Troubleshoot tab, you can change the rate of hardware acceleration for the video card. If you are having no problems, this setting should be left at Full. However, if you are experiencing performance problems, try reducing the acceleration value in slight increments to attempt to resolve the problem.

You can also configure the appearance of your folders, and some great customization options are available to you. See Chapter 8 for details.

Chapter 2

Managing Users

IN THIS CHAPTER

- Managing users
- Managing groups
- Using Group Policy

WINDOWS XP IS A true multiuser system, meaning different users can log on to the computer and run Windows, all the while keeping private documents and settings private. As such, you'll need to manage user and group accounts in Windows XP and configure them in a manner that is effective for your multiuser environment. Along with user configuration, you might also want to use Group Policy, a feature that allows you to enforce a number of systemwide settings and features that apply to both the computer and the local user. This chapter explores all of these features and shows how to make the most of user management in Windows XP.

Managing Users in Windows XP

Windows XP is a multiuser system, from both a home and professional perspective. In the Windows 9*x* days, multiple people could use the same computer, but all users could easily access others' files and folders. In other words, there wasn't much protection; any user could basically make any configuration changes to the computer that he or she desired. This naturally caused a lot of problems for Windows 9*x* in work environments, and some home environments as well. (If you let your children use the computer, there was no way to control what they did to it.)

Windows XP leaves that legacy behind. With Windows XP, an administrator account can manage the entire computer, but limited accounts have restrictions. Regardless of the account, each user's settings, files, and folders are kept separate from other users and are completely protected by passwords (if you so choose). Users log on to the local machine using a username and password, and each user's private files stay that way.

You are probably also aware that user management can refer to a domain model, where Windows XP Professional computers are used in a larger networking environment. In this case, users do not (typically) log on to the local machine, but to a Windows server. The server identifies the user and enables the user to log on to the domain so that network resources can be used. Network administrators who work with Windows 2000/XP servers handle user management in this kind of environment. In this chapter, user management and users always refer to local user management on your machine.

Because of the need for solid user management, Windows XP organizes itself somewhat differently, based on the user. User accounts on your Windows XP computer have their own folder, found in Documents and Settings folder under the username. Using these profiles, Windows can easily store different configuration settings, files, Internet Explorer Favorites and History, and a number of other items. After a user logs on, he or she can access the information in his or her folders but cannot access information in other users' folders, unless the user is an administrator.

When you install Windows XP, there are two default accounts – administrator and guest. The administrator account is automatically created, and it cannot be deleted, disabled, or removed from the Local Administrators group (groups are covered later in this chapter). The guest account, on the other hand, is designed for people who do not actually have a user account on the computer. A user can log on with the guest account, but he or she essentially has no rights to do anything. You can disable the guest account if you have no need for it, and in terms of security, it's a good idea to do so unless you are actively using it.

Working with User Accounts

Windows XP gives you two tools that can be used to set up user accounts on your local computer – User Accounts in the Control Panel and Computer Management. For experienced users, Computer Management is faster and easier to use than the sometimes too friendly graphical user interface (GUI) of User Accounts, but some important options are found in User Accounts that are not present in Computer Management.

User Accounts in the Control Panel

The User Accounts option in the Control Panel presents you with a simple interface (shown in Figure 2-1) for creating and managing user accounts on your computer. You can see the current accounts and the icons associated with those accounts on this screen as well.

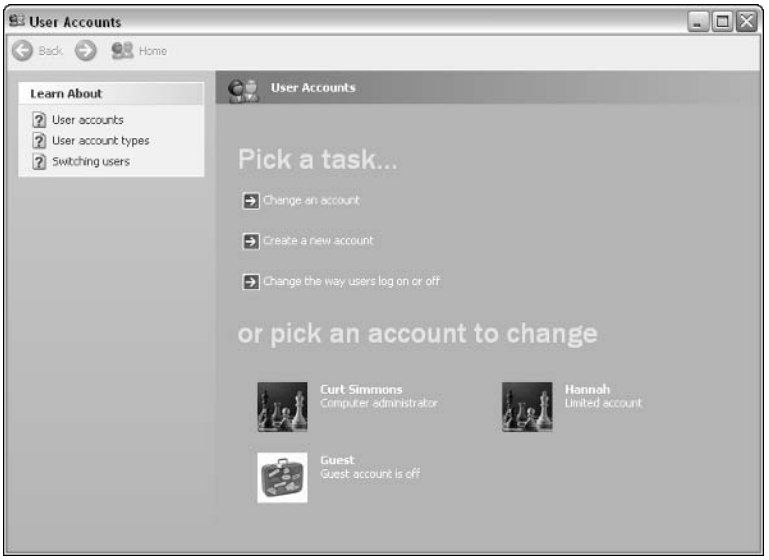

Figure 2-1: User Accounts in the Control Panel.

You can take three different actions from the User Accounts interface.

- Change an account.
- Create a new account.
- Change the way users log on or off.

The following sections explore these options.

CREATE A NEW ACCOUNT

The User Accounts feature enables you to easily create new accounts with the help of a miniature wizard that appears when you click Create an account option on the main page. The following steps walk you through an account creation:

1. When you click the Create an account option, you are prompted to enter a username and click Next. The user account name is the name that will appear on the Welcome Screen and the Start menu, so you should use the person's real name as a general rule – there is no security reason to use usernames other than the user's actual name unless you do not want a user to know who else logs on to the computer.

2. On the next window, shown in Figure 2-2, you are prompted to choose an account type, either Computer administrator or Limited. Select the desired radio button and click Create Account. Before doing so, you have to determine the kind of account you are creating. The computer administrator account gives the user total control over the computer. The administrator can add and remove accounts, configure system components, install programs, and format and reconfigure hard drives; the administrator can do anything – he or she has total control over the computer. You can have more than one computer administrator, but you should be very careful to whom you give this level of control. The limited account user can change his or her password and desktop settings, create and view files, and view items in the Shared Documents folder. Limited users may not be able to install programs, and it is important to note that some pre-Windows XP or Windows 2000 programs might not work well on limited accounts. Basically, the limited user can use the operating system, but can't make any harmful configuration changes to it. When you have made your selection, click the Create Account button.

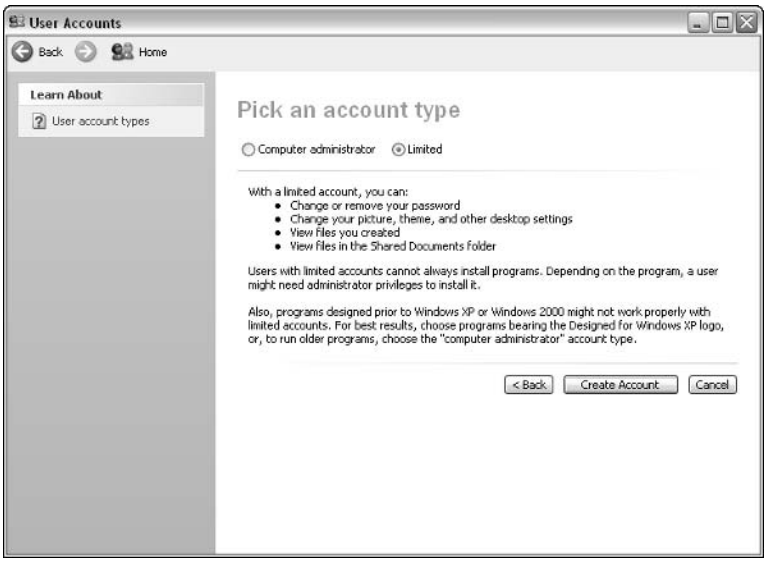
User Accounts
Back
Home
Learn About
User account types
Pick an account type
Computer administrator
Limited
With a limited account, you can:
Change or remove your password
Change your picture, theme, and other desktop settings
View files you created
View files in the Shared Documents folder
Users with limited accounts cannot always install programs. Depending on the program, a user might need administrator privileges to install it.
Also, programs designed prior to Windows XP or Windows 2000 might not work properly with limited accounts. For best results, choose programs bearing the Designed for Windows XP logo, or, to run older programs, choose the "computer administrator" account type.
< Back
Create Account
Cancel

Figure 2-2: Pick an account type.

CHANGE AN ACCOUNT

You can change an account at any time by clicking the Change an Account button on the User Accounts interface. This opens a window where you simply click the account you want to change.

A window appears with a list of tasks that you can perform, such as change the name, create a password (delete a password), and change the account type. You can change anything you configured when you created the account, and you can change the picture, create a password, and delete the account.

Windows XP's theme uses pictures to represent user accounts, along with the account name. A default, unique picture is assigned to each user. If you click the Change Picture option, a window appears (shown in Figure 2-3) where you can select a new picture icon from the provided list, or you can browse your computer and locate another picture. You can use just about any kind of picture format (JPEG, GIF, BMP, and so on). You might want to use company icons, or in a home setting, you might actually use a photograph of the person to represent the user account. Simply choose a desired picture and click the Change Picture button.

Figure 2-3: Change Picture option.

The Create a Password option enables you to create a password for the user. Windows XP gives you the freedom to have users log on with passwords, or to not use them. A password ensures that only the person to whom the account belongs can log on to the computer, assuming the password is kept secret. Again, in a very small office or home situation, you may not want to use passwords, but if security for some accounts is a concern, you need to assign a password. To meet security standards, passwords should be at least seven characters long and use both letters and numbers. Common names, phone numbers, and related information should not be used. Keep in mind that if you do not use passwords, any user will be able to click any account on the Welcome screen and log on; so even in a home situation where you want to keep other family members out of your personal folders, use a password.

When you click the Create a password option, a window appears where you can enter the password, reenter it for confirmation, and type a word or phrase as a password hint, as shown in Figure 2-4. The password hint is descriptive text that reminds you of the password, but the hint can be viewed by anyone, so you have to be careful.

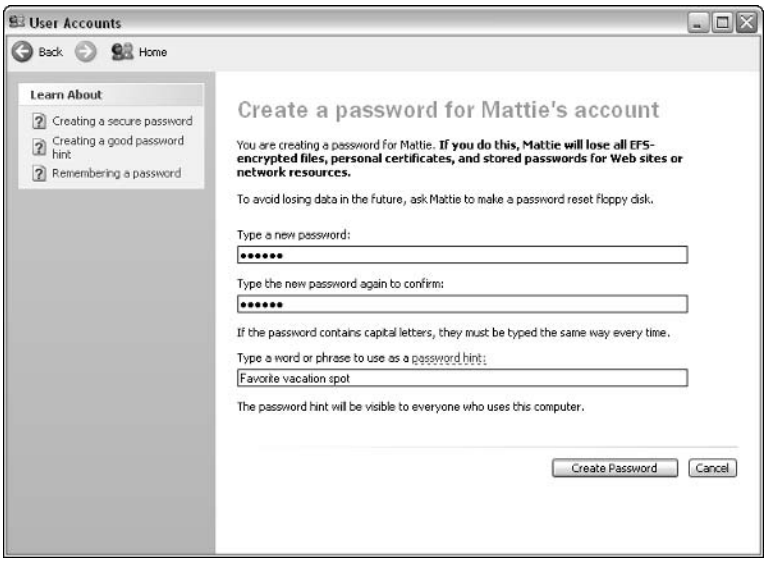
User Accounts
Back
Home
Learn About
Creating a secure password
Creating a good password hint
Remembering a password
Create a password for Mattie's account
You are creating a password for Mattie. If you do this, Mattie will lose all EFS-encrypted files, personal certificates, and stored passwords for Web sites or network resources.
To avoid losing data in the future, ask Mattie to make a password reset floppy disk.
Type a new password:
Type the new password again to confirm:
If the password contains capital letters, they must be typed the same way every time.
Type a word or phrase to use as a password hint:
Favorite vacation spot
The password hint will be visible to everyone who uses this computer.
Create Password
Cancel

Figure 2-4: Create password.

Finally, you can also delete an account. When you delete an account, Windows will save all of the user's desktop contents and the My Documents folder to a folder named with the username on the desktop. This enables you to easily place the contents on a disk and give it to the user who will no longer be accessing the computer. If you want to use this option, click Keep Files – if not, click Delete Files.

CHANGE THE WAY USERS LOG ON OR OFF

The log on and off setting is a global setting that applies to all users. You have only two check box options here:

- **Use the Welcome screen** – The Welcome screen provides the accounts created on this computer so that a user can click on his or her account and enter a password if necessary. Essentially, this is a graphical logon screen. If you want a more secure environment, turn this feature off. A standard Windows logon prompt will appear where the user must enter the actual username and password and will not be able to see the usernames of the other local users.

- **Use Fast user switching** – Fast user switching enables quickly changing users without closing any programs, which can be really helpful in a collaborative situation where several people are working on a project together at one computer. The caveat here is that Fast user switching is not compatible with offline files.

Creating a Password Reset Disk

One thing that users can and should do is access the User Accounts option in the Control Panel and create a password reset disk. The password reset disk allows a user to reset his or her password should the password be forgotten, rather than the computer administrator having to take over and change it for the user. Once the user creates his or her password reset disk, he or she should keep it in a safe, secure place until it is needed. Follow these steps to create a password reset disk:

1. Open User Accounts in the Control Panel.
2. On the User Accounts window, click your user account icon.
3. On the next window, click the Prevent a Forgotten Password link option in the Related Tasks box.
4. A wizard begins. Click Next on the Welcome screen.
5. On the Create Reset Disk window, choose the drive where you want to save the password key, such as your computer's floppy disk drive. Click Next.
6. On the next window, enter your current user account password and click Next.
7. The password key is recorded on your disk. Click Next, and then click Finish.

Creating User Accounts with Computer Management

The Computer Management console also allows you to create and manage user accounts and group accounts. With a little experience under your belt, this will probably be the console you prefer to use. You can do everything here (and more) that you can do with the Users option in the Control Panel, except assign pictures to accounts and choose whether or not to use the Welcome screen and fast user switching. Beyond that, Computer Management is faster and gives you more options for user account configuration.

Computer Management is available in Administrative Tools in the Control Panel. If you open Computer Management → System Tools → Local Users and Groups, you

can click on Users and see a listing of the user accounts on your computer. You'll notice in Figure 2-5 that some of the listed accounts, aside from Administrator and Guest, were not created by you. These accounts are used by Microsoft support, Internet Information Server (IIS) (if it is installed), and for Remote Desktop help assistance.

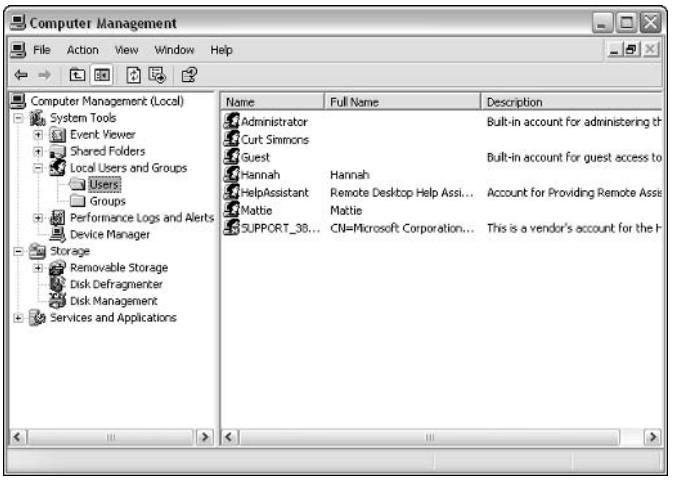

Figure 2-5: Computer Management.

Notice that you cannot assign new accounts as Administrator or Limited here, but you can configure the account properties, which will be discussed in the next section.

Using the Computer Management console, you can easily create new users and manage existing user accounts. The following steps show you how to create a new user with the Computer Management console.

1. Open Computer Management → System Tools → Local Users and Computers. Right-click the Users container and then click New User.
2. The New User window appears, as shown in Figure 2-6. Complete the information in the text boxes. If you want to assign a password, enter and confirm the password and choose one of the following check boxes:
   - **User must change password at next logon** – This option enables you to provide a default password to the user so he or she can log on to the computer, but once logged on, the user must create his or her own password that is used from that point on.

- **User cannot change password** – If you prefer to provide passwords instead of allowing the users to create them, choose this option.
- **Password never expires** – If you have Group Policy configured to expire passwords after a certain length of time, you can check this box to override the expiration policy, if necessary. See the Group Policy section later in this chapter to learn more about Group Policy.
- **Account is disabled** – You can disable an account here if you want to stop the user from logging on with the account, but you won't delete the account.

3. When you are done, click the Create button. The new account appears in the Users container.

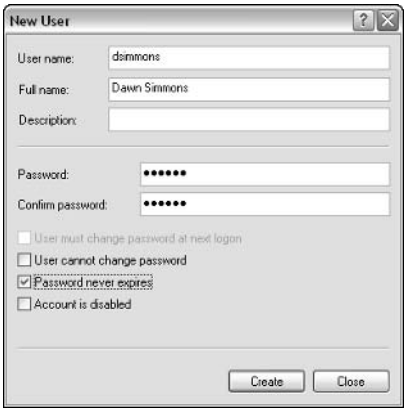

Figure 2-6: New user creation.

Managing User Accounts

Just as you can create a new user account with the Computer Management console, you can easily manage the accounts that you create. If you select Users in the left pane, a list of users configured on your computer appears in the right pane. If you select a user in the right pane and right-click the icon (or use the Action menu), you can choose to reset the account's password, in which case a dialog box appears. This action is the same as using the User Accounts interface – if you have to reset an account's password, all Effective Field Size (EFS) encrypted files, Web passwords, and related settings are lost. Because of this, it is best for users to create their own password backup disks so that data isn't lost when a user forgets his or her password.

You can also delete and rename the account, and you can click Properties to access the Properties sheets. On the Properties sheets, you see three tabs. On the General tab, you can make the same changes that were presented when you created the account. You can configure the password never to expire, choose an option so that the user must change the password at next logon, a combination of these, and so on. An additional check box you will see here is the Account is locked out option. Depending on the Group Policy settings, a user's account may lock after so many unsuccessful password attempts. This is a security feature that keeps someone from trying to break the password by entering guesses over and over. In environments where security is an issue, "three tries and you are locked" is often the policy. You can't lock the user's account here; you can only unlock it if it is locked from failed password attempts.

The Member of tab provides a place to add the user to groups that are configured on your computer. Group membership determines what the user is able to do on the computer (or not do). To add a user to a group, click the Add button and select the desired group from the list that appears. You can learn more about the default groups and group usage in the next section.

Finally, you also see a Profile tab. If a profile or logon script is used with the user, you can point to the location of the profile or logon script here. Because you are dealing with local users, you probably will not use this tab, and most profile information is now configured in Group Policy, which is also explored later in this chapter.

Managing Groups

Windows XP configures several default group accounts for you. The purpose of groups is to organize users so that they have certain permissions. With local user configuration, groups are not such a big deal because your users are typically either administrators or those with limited accounts, which are provided by default. This group structure is the same as that used by network administrators to organize network users and assign permissions. Group configuration and assignment can get very complex if you are a server administrator, but for the local computer, you'll spend little to no time worrying about groups. The important thing to realize is that each user account needs to be assigned to at least one group that has the permissions that you desire.

There are several default groups, with the three primary groups being Administrators, Power Users, and Users. Table 2-1 outlines each of these groups and the other groups that might appear on your system.

TABLE 2-1 DEFAULT WINDOWS XP GROUPS

Group	Explanation
Administrators	Computer administrators have complete control over the computer. Administrators can add and remove users and groups, configure the system, install and remove hardware, reconfigure hard drives, install applications, and perform any other action that is available under Windows XP.
Power Users	Power Users can perform most actions that administrators can perform, but they can only modify and delete accounts that they create. Also, they can only modify group memberships that they have created. They can remove users from Power Users, Users, and Guests groups. They cannot modify the administrators and backup operators groups, take ownership of files, or perform backup and/or restore functions. They cannot change device drivers or manage security or log and/or auditing.
Users	This is the default limited user account. Users can configure the desktop systems and create files, but they cannot make any configuration changes to the system, add or remove accounts, or access other users' folders.
Backup Operators	Backup Operators can back up and restore files on the computer, regardless of which user owns those files. Backup operators cannot be changed.
Guests	This enables a guest to log on to the computer. Guests can perform basic computing actions, but do not have all of the abilities given to the limited user accounts.
Network Configuration Operators	This provides some basic administrative privileges for the configuration of Windows XP's networking features. Typically, under local usage, the administrator would handle these functions.
Remote Desktop Users	If Remote Desktop is configured, this group is provided for remote desktop users to access the remote access connection.

Continued

TABLE 2-1 DEFAULT WINDOWS XP GROUPS *(Continued)*

Group	Explanation
IIS Groups	If IIS is installed, you'll see additional groups, such as administrators for the Web site, authors for the Web site, and so on.
Help Services Group	This is provided for the Help and Support Center.

Along with the default groups, you can also create your own group. Just right-click the Groups container and click New Group. Then name the new group and add the desired users, as shown in Figure 2-7. Organizing a group this way enables you to add this new group to the default security groups, as provided. Of course, you can simply add individual users to the default security groups, and if only a few people use the Windows XP computer, this is probably your easiest choice. If you double-click a desired group in the console pane, you can see the current members of the group and adjust the members, as desired.

Figure 2-7: New Group.

Using Group Policy

One of the biggest problems in networking environments and on a standalone, multiuser computer is managing other users. Say you are the administrator for a local computer, and your family members also use the computer. You control what the other users can do with user accounts, but you wish you had more power to fine-tune their capabilities on Windows XP. Well, you can use a tool called Group Policy.

Group Policy is used to invoke certain settings on computers and user accounts and control what users are able to do. On a network, network administrators can use Group Policy to automatically install and manage software on their users' computers, enforce settings, and even automatically remove software when it is no longer needed.

If you have read anything about Group Policy, you may think of it as a network feature. While it is true that the main focus of Group Policy is the configuration of network clients by network administrators, you can also use it to administer your local computer so that settings you configure affect the users logging on to the computer. This is a powerful way to standardize settings for all users.

Group Policy is not available to you as a tool in any folder, but it is available as a Microsoft Management Console (MMC) snap-in. You can add the snap-in to a new or existing console and begin using Group Policy as a management tool on Windows XP. To use Group Policy, you must be using Windows XP Professional, and you must log on as an administrator. The following steps show you how to open the Group Policy console.

Refer to Chapter 10 for more information on the MMC.

1. Click Start → Run. Type **MMC** and click OK.
2. In the MMC console, click File → Add/Remove Snap-in.
3. In the Add/Remove Snap-in window, click Add.
4. In the Add Standalone Snap-in window, select Group Policy, as shown in Figure 2-8, and click Add.

Figure 2-8: The Add Standalone Snap-in window.

5. In the Welcome to the Group Policy Wizard window, shown in Figure 2-9, leave the default selection, Local Computer, selected, then click Finish.

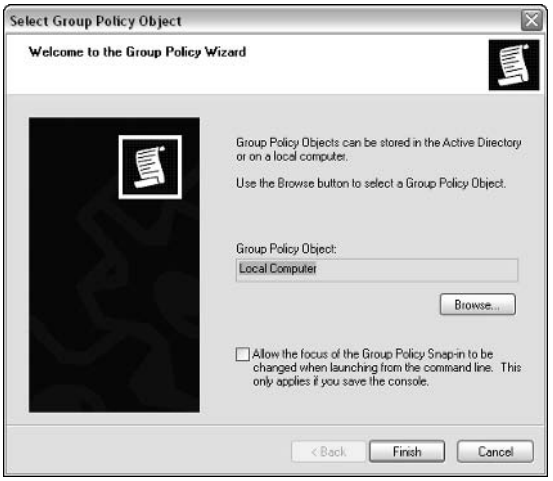
Select Group Policy Object
Welcome to the Group Policy Wizard
Group Policy Objects can be stored in the Active Directory or on a local computer.
Use the Browse button to select a Group Policy Object.
Group Policy Object:
Local Computer
Browse...
Allow the focus of the Group Policy Snap-in to be changed when launching from the command line. This only applies if you save the console.
< Back
Finish
Cancel

Figure 2-9: Group Policy window.

6. Click Close on the Add Standalone Snap-in window and click OK on the Add/Remove Snap-in window.
7. The snap-in appears in the Console. Click File → Save As to save the console. Name the console **group policy** and save it to a desired location. From now on, all you have to do is double-click the new console to open Group Policy.

Group Policy Features

After you have the Group Policy snap-in loaded, you see the Local Computer Policy node. This expands into the Computer Configuration node and the User Configuration node. The Computer Configuration node contains settings that you want to impose on the computer system when users log on. For example, you can use the Computer Configuration node to automatically enable disk quotas for users on your computer. On the other hand, the User Configuration node provides you with settings you can apply to the user. If you click through the options in either container, you'll notice that they are largely the same. This is because computer settings apply to a computer whereas user settings apply to the user, regardless of what computer he or she is logged onto. Because you are only configuring the local user on the local computer, settings are rather redundant. I'll help you explore your options later in this chapter.

If you expand each category, you see Software Settings, Windows Settings, and Administrative Templates. Each of these nodes then further expands into different categories of settings, which may also expand into different categories as shown in Figure 2-10. Once you expand into a category, the different available settings you can apply from within that category appear in the details pane.

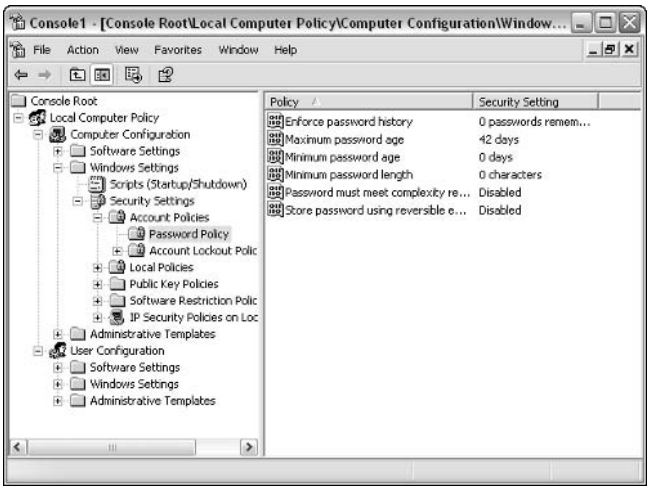

Figure 2-10: Group Policy settings.

Configuring Group Policy Settings

Once you navigate through the policy options in the left-hand pane, you can locate the desired policy you want to implement in the right-hand pane. You can configure a desired setting by double-clicking it to open the category. This opens the setting window for the desired item. For example, you can see in Figure 2-11 that I have opened the Enable Active Desktop Properties window. At this point, I can use the Setting tab to enable the active desktop, disable it, or leave it unconfigured. If you click the Explain tab, you learn more about the particular entry. The large dialog box that appears in the middle of the window may become active, depending on your selection and entry. If it does, another setting becomes available for you to configure for your policy. What you see here all depends on the policy you are configuring.

Figure 2-11: The Enable Active Desktop Properties window.

Before using Group Policy, it is important that you have a firm understanding of the Not Configured, Enabled, and Disabled options. To make sure you configure Group Policy to meet your needs, make sure you understand the following:

- **Not Configured** – The setting is simply not configured – in other words, no setting is written to the registry. Whatever the setting is by default, that is what is used.
- **Enabled** – The setting is enabled and written to the registry.
- **Disabled** – The setting is disabled and written to the registry.

Let's return to the Active Desktop example I used earlier. Those settings would mean the following:

- **Not Configured** – Nothing is changed and the default setting is used. Active Desktop is not enabled by default, so it would not be enabled. The user can enable it if he or she wants, assuming he or she has proper permission to do so.
- **Enabled** – Active Desktop is turned on and functional. Users cannot turn it off.
- **Disabled** – Active Desktop is turned off and not functional. Users cannot turn it on.

The last two settings require registry entries while the first simply says, "Do nothing." As you are configuring Group Policy, remember that you should not enable or disable any setting that doesn't apply to you – leave the setting to Not Configured. Otherwise, you are creating unneeded registry entries that can bog down the computer's loading time.

At the bottom of each policy window, you see the Supported on setting, which will tell you if the setting applies to at least Windows 2000 or Windows XP. In later revisions of Windows, this at-least setting will be more useful because more versions will support Group Policy. You can also navigate through the settings in the category by simply using the Previous Setting and Next Setting buttons.

For the most part, the configuration windows you see within Group Policy look the same as the examples shown here. However, depending on the settings, some windows will have differences. For example, some of the security-setting dialog boxes do not use an Enabled/Disabled appearance, but they provide you with a configuration option, such as the logon attempt lockout setting, shown in Figure 2-12.

Figure 2-12: Account Lockout Group Policy.

Regardless, the configuration windows you see in Group Policy are easy and self-explanatory. Configuring Group Policy is as easy as locating the setting that you want to change, adjusting the setting as desired, and clicking OK. When users log on to the Windows XP computer, the setting in Group Policy will be applied.

To use Group Policy, you have to find the setting that you want to configure, and then choose an enforcement option to invoke that policy. Locating what you want can be a little challenging at times because you have so many potential settings to choose from. It is also important to remember that a number of settings that are found in the Group Policy console do not apply to local computer configuration. The Help files are also full of references to Windows 2000 domain configurations and other networking issues that do not apply to the local computer. This

is because the Group Policy snap-in tool is a global tool used on both servers and workstations. The following section reviews the major settings found in the different nodes and points out the settings you are most likely to use. You can use this information when you sit down to work with Group Policy as a sort of filter to help you get to the settings you most likely need.

Computer Configuration

The following sections explore the containers found under the Computer Configuration node. Keep in mind that Computer Configuration and User Configuration, though useful, are designed for networked computers in a domain where users may log on to the network at different workstations. User Configuration enables the users to receive the same configuration regardless of the computer they are using, whether there is a computer policy applied or not. Because you are configuring a local computer with local users, most of your configuration is going to be focused in the Computer Configuration node.

Software Settings

The Software Settings container provides a place where network administrators can configure software packages that are delivered to computers on a network. It is a way to automatically roll out software and manage it from one central location. Because you are configuring a local computer, this setting does not apply to you.

Windows Settings

Windows settings contain Group Policy objects for startup and shutdown scripts, as well as a variety of security settings. If you want to use startup and shutdown scripts with users on your network, you can apply the scripts by opening the startup or shutdown properties window and adding a script to the policy. Then the script will be used each time the computer is started or shut down.

Under Security Settings, you see a number of additional containers. The following sections and tables point out setting options on your computer that you might find useful.

ACCOUNT POLICIES

Account Policies refer to password policy and account lockout policy for users. Table 2-2 reviews the options you can configure here. I have listed the ones that apply to the local computer only.

TABLE 2-2 ACCOUNT POLICIES

Policy	Explanation
Enforce password history	When enabled, requires Windows XP to remember passwords for users. You can choose the number of passwords that should be remembered.
Maximum password age	The default setting is 42 days. You change it here. Also, if you choose the "password never expires" setting on a user's account properties, the maximum setting is overwritten so that it never expires.
Minimum password age	When enabled, requires that a password be used for a certain amount of time until it is changed. By default, 0 is the setting.
Minimum password length	You can use this setting to enforce a minimum password length, creating more secure user accounts. This setting is set to 0 by default.
Passwords must meet complexity requirements	Disabled by default, this setting requires both numbers and letters in the password.
Account lockout duration	Specifies the amount of time that an account will stay locked once it has been locked due to password failure. This is not configured by default.
Account lockout threshold	Specifies the amount of time a user can attempt to log on before the account is locked. This setting is 0 by default.
Reset account lockout counter	Specifies the amount of time that passes before the account lockout counter is reset.

LOCAL POLICIES

Local Policies include a section of settings concerning audit policy, user rights assignment, and security options. Audit Policy contains a number of individual settings, such as audit account logon events, audit account management, audit policy change, and so on. Some of these apply to the local computer, while some are specific to networking. If you want to enforce auditing on your Windows XP Professional computer, these settings can be enabled so that auditing always occurs. The User Rights container contains a number of settings showing the groups that have permission to perform a certain action.

There are quite a few of these settings, and Table 2-3 points out the ones that you are likely to find helpful. The policy and the default settings are listed.

TABLE 2-3 USER RIGHTS ASSIGNMENT

Policy	Defaults
Back up files and directories	Administrators/Backup operators
Change the System Time	Administrators/Power Users
Create pagefile	Administrators
Increase scheduling priority	Administrators
Load and unload device drivers	Administrators
Manage auditing and security logs	Administrators
Modify firmware environment variables	Administrators
Perform volume maintenance	Administrators
Profile single processes	Administrators, Power Users
Profile system performance	Administrators
Restore files and directories	Administrators, Backup Operator
Shut down the system	All groups
Take ownership of files and other objects	Administrators

The final container under Local Policies is Security Options. The Security Options container holds individual options for various security options, such as accounts, auditing, devices, and so on. Table 2-4 points out the options under each division.

TABLE 2-4 SECURITY OPTIONS

Policy	Options
Accounts	Provides individual settings for Windows accounts. Configure administrator account status, configure guest account status, limit local use of blank passwords, rename administrator account, and rename guest account.

Policy	Options
Audit	Provides individual settings for auditing permissions. Configure audit access of global system objects, audit the use of Backup and Restore, and shut down the system immediately if unable to log security events.
Devices	Provides individual settings for devices, such as allow undock without logon, allow format and eject removable media, prevent users from installing print devices, restrict CD-ROM access to locally logged-on user only, restrict floppy access to locally logged-on user only, and unsigned driver installation behavior.
Domain Controller	Settings apply to domain controllers; not applicable for Windows XP Professional.
Domain Member	Settings for domain members; not applicable for Windows XP Professional.
Interactive Logon	Provides interactive logon settings, such as do not display user last name, do not require CTRL+ALT+Del, message text for users attempting to log on, and others.
Microsoft Network Client	Provides machine configuration for networking, such as digital signatures, and unencrypted password usage.
Microsoft Network Server	Not applicable for Windows XP Professional.
Network Access	Provides a number of network access settings, including permissions and security models.
Recovery Console	Provides settings for recovery console.
Shut Down	Allows system shutdown without logon and clear virtual memory pagefile options.
System Cryptography	Provides encryption settings.
System Objects	Provides default owner and internal system settings.

PUBLIC KEY POLICIES

This container holds the Encrypting File System container, which may not contain any settings on your Windows XP computer.

SOFTWARE RESTRICTION POLICIES

Software Restriction Policies allow you to set a default policy that enables or disables software usage, according to the user's group membership. By default, the unrestricted setting is configured, which you will probably want to change. If any additional software restriction rules are available, those appear here as well.

IP SECURITY POLICIES ON LOCAL COMPUTER

If Internet Protocol (IP) Security is used on your network, the default client and server policies reside here. A network administrator typically configures these settings on an enterprisewide basis.

Administrative Templates

The final major container in the Computer Configuration node is Administrative Templates. These are a collection of template settings from a number of Windows Operating System (OS) divisions, such as Windows Components, System, Network, and Printers. There are many available settings here, virtually all of which are not configured. The following sections address these settings one container at a time. While I do not address every possible configuration option, I do point out the ones that are more likely to be useful from a local computer perspective.

WINDOWS COMPONENTS

The Windows Components division provides settings for NetMeeting, Internet Explorer Task Scheduler, Terminal Services, Windows Installer, and Windows Messenger. Under NetMeeting, your only option is to disable remote Desktop Sharing. Under Internet Explorer, you have the configuration options as presented in Table 2-5:

TABLE 2-5 INTERNET EXPLORER OPTIONS

Policy	Description
Security Zones: Use only machine settings	Applies the same zone settings to all users. By default, each user can define his or her own.
Security Zones: Do not allow users to change policies	Users cannot change security zone settings.
Security Zones: Do not allow users to add or delete sites	Users cannot add or delete security sites.
Make proxy settings per machine	Proxy settings are applied to all users, not configured on a user-by-user basis.

Policy	Description
Disable automatic install of Internet Explorer components	Prevents Internet Explorer (IE) from automatically installing new components.
Disable periodic check for IE software updates	Disables IE from automatically checking the IE update site for new downloads.
Disable software update shell notifications on program launch	If enabled, users will not be notified if IE updates their programs using the Microsoft Software Distribution Channel.
Disable showing the splash screen	The IE splash screen does not appear when the user starts the browser.

The next option is Task Scheduler, which contains the setting options listed in Table 2-6.

TABLE 2-6 TASK SCHEDULER

Policy	If Enabled . . .
Hide Property Pages	Users cannot view or change the properties of an existing task.
Prevent Task Run or End	Users cannot manually stop or start a task.
Prohibit drag and drop	Users cannot add or remove tasks by copying them into the Scheduled Tasks folder.
Prohibit new task creation	Users cannot create new tasks.
Prohibit task deletion	Users cannot delete tasks.
Remove advanced menu	Users cannot change or view the properties of newly created tasks.
Prohibit browse	Users cannot change the schedule program for existing tasks and are limited to the task items on their Start menu.

The next section is Terminal Services. If you are using Terminal Services in Windows XP to connect to Windows 2000 terminal servers, a network administrator would typically configure these settings. You can easily review them if you like, but unless you are a network administrator, you are unlikely to use these settings.

Next, you can invoke settings for Windows Installer. Windows Installer helps you add programs to and remove programs from Windows with ease, but you can change some settings that can help you better control the Windows XP computer. Table 2-7 outlines these for you.

TABLE 2-7 WINDOWS INSTALLER

Policy	If Enabled...
Disable Windows Installer	Disables the use of Windows Installer.
Always install with elevated privileges	Any programs are installed using system permissions.
Prohibit rollback	Stops Windows from creating rollback files so that an install can be reversed.
Remove browse dialog box for new source	Disables the Browse button in Windows Installer.
Prohibit Patching	Windows Installer patches cannot be used.
Disable IE security prompt for Windows Installer scripts	Allows Web-based programs to install software on the computer without having to notify the user.
Enable user control over installs	Enables users to change installation options that are normally available to administrators only.
Enable user to browse for source while elevated	Users can search for installation files during privileged installations.
Enable user to use media source while elevated	Allows users to install programs from removable media during privileged installations.
Enable user to patch elevated products	Programs can be upgraded during privileged installations.
Allow administrators to install from Terminal Services sessions	Allows administrators to install from Terminal Services sessions.
Cache transforms in secure location on workstation	Saves copies of transform files on the local computer.
Logging	Determines the kinds of events that Windows Installer logs.

Policy	If Enabled...
Prohibit User Installs	Enables you to prohibit or limit user installs.
Turn off creation of System Restore Checkpoints	Stops System Restore from functioning because check points are not created.

Finally, under the Windows Message container, you have two options. You can choose not to allow Windows Messenger to be used or not to automatically start Windows messenger.

SYSTEM

The System container contains a number of different subcontainers with settings on a variety of options pertaining to the Windows XP system. These settings are easy to use and you can implement a number of interesting controls (detailed in the list below). I suggest you spend a little time learning more about this portion of Group Policy.

- **User Profiles** – Contains user profile settings, such as the following:
  - Do not detect network settings
  - Wait for remote user profile
  - Prevent roaming profile changes from propagating to the server
  - Only allow local user profiles
- **Scripts** – Provides settings for logon and logoff scripts.
- **Logon** – Provides logon settings, including the following:
  - Always use classic logon
  - Do not process the run once list
  - Do not process the legacy run list
  - Always wait for the network at computer startup
- **Disk Quotas** – Provides disk quota settings, such as the following:
  - Enable disk quotas
  - Enforce quota limit
  - Default quota limit and warning level
  - Log event when quota is exceeded
  - Apply policy to removable media

- **Net Logon** – Provides logon settings when logging on to a Windows domain. These setting are typically set on client computers by network administrators.
- **Group Policy** – The Group Policy settings determine how Group Policy is refreshed on client computers and other network administration issues. Most of these settings are used by network administrators for network client computer configuration.
- **Remote Assistance** – Provides two settings where solicited and offer remote assistance can or cannot be used.
- **System Restore** – You can choose to turn off system restore and configuration.
- **Error Reporting** – Provides advanced error reporting settings and error notification.
- **Windows File Protection** – Provides Windows File Protection settings, such as the following:
  - Hide file scan progress window
  - Limit Windows file protection cache size
  - Specify Windows File protection cache location
- **Remote Procedure Calls (RPC)** – Enables RPC troubleshooting state information and propagation of extended error information.
- **Windows Time Service** – You can enable global configuration settings here that apply to all local users.

NETWORK

The Network settings provided under Administrative Templates may be useful for local user and computer configuration, although a number of these are more appropriately used by network administrators. The following list reviews these options.

- **Domain Name Server (DNS) Client** – Provides DNS client settings. These are typically configured by network administrators.
- **Offline Files** – If users on your computer use offline files, you can enforce a number of settings here, including the following:
  - Allow or disallow offline files
  - Prohibit user configuration of offline files
  - Allow default cache size

- Do not allow files to be cached
- Turn off reminder balloons
- Assure even logging level
- Encrypt the offline file cache
- Configure slow link speed

- **Network Connections** – Contains settings for Internet Connection Sharing (ICS) and Internet Connection Firewall (ICF)
- **QoS Packer Scheduler** – Provides Quality of Service (QoS)-enforced settings. These are normally configured by network administrators.
- **Simple Network Management Protocol (SNMP)** – SNMP is used and configured by network administrators.

PRINTERS

The Printers container holds settings that network administrators configure to determine how and if users can publish printers on the Active Directory on a Windows 2000 network. Nothing can be configured here for the local machine.

User Configuration

As I mentioned earlier, many of the settings under User Configuration are the same as those under Computer Configuration. Keep in mind that on a network, Computer Configuration applies to a group of computers and User Configuration applies to a group of users. Computers receive their policy and users receive their policy – regardless of what computer is logged on to or whether that computer is managed by Group Policy.

You can invoke a number of user-specific settings. You may find these helpful, especially if you need to tightly control users who log on to your computer (such as your children or co-workers). I'll not repeat information covered in the previous section, but I do want to point out some of the interesting options available to you.

INTERNET EXPLORER

If you expand Windows Settings, you'll see a container for Internet Explorer Maintenance. If you open this up, you'll find a number of fun items. For example, as you can see in Figure 2-13, you can create your own custom title for Internet Explorer. You can also access options to create a custom logo and animated bitmaps, and you can even customize the toolbar background. These settings are primarily provided for companies who want to provide company branding on IE, but you can play around with them too and create your own custom look.

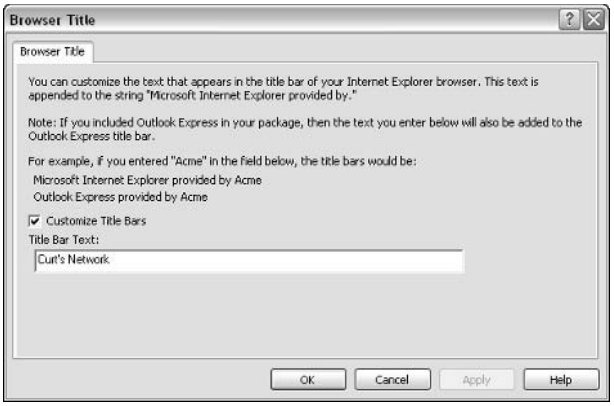
Browser Title
Browser Title
You can customize the text that appears in the title bar of your Internet Explorer browser. This text is appended to the string "Microsoft Internet Explorer provided by."
Note: If you included Outlook Express in your package, then the text you enter below will also be added to the Outlook Express title bar.
For example, if you entered "Acme" in the field below, the title bars would be:
Microsoft Internet Explorer provided by Acme
Outlook Express provided by Acme
Customize Title Bars
Title Bar Text:
Curt's Network
OK
Cancel
Apply
Help

Figure 2-13: IE custom title bar option.

Additionally, you can use the categories provided under Internet Explorer Maintenance to customize the following:

- The connection
- Favorites
- The home page
- Security settings
- Default programs

Using Group Policy, you can configure most of the items you find on Internet Options so that they are enforced for all users on your computer.

START MENU AND TASKBAR

You can configure the Start menu and taskbar and force desirable configurations on other users. If you expand Administrative Templates, you see the Start Menu and Taskbar node. There are a number of settings here; the following list points out some of the more interesting ones:

- Remove links and access to Windows Update
- Remove My Documents from the Start menu
- Remove Programs from the Settings menu
- Remove Network Connections from the Start menu
- Remove Search from the Start menu (in fact, you can remove just about anything)

- Add Logoff to the Start menu
- Prevent changes to the Start menu and taskbar
- Turn off personalized menus
- Do not keep history of recently opened documents
- Prevent grouping of taskbar items
- Lock the taskbar
- Force Classic Start menu
- Remove balloon help
- Remove and disable the Turn Off Computer button
- Hide the Notification Area

DESKTOP

As with the Start menu and taskbar, you can customize the desktop as well. Again, a number of configuration options are available; the following list points out some of them:

- Hide and disable all items on the desktop
- Remove the Recycle Bin from the desktop
- Prevent adding, dragging, dropping, and closing the taskbar toolbar
- Don't save settings at exit
- Prohibit adjusting desktop toolbars
- Remove the Desktop Cleanup Wizard

CONTROL PANEL

Finally, you can customize the Control Panel settings and keep users out of configuration areas where they should not be. For example, you can do the following:

- Prohibit access to the Control Panel
- Hide specified Control Panel applets
- Force Classic Control Panel style
- Prevent the addition and/or deletion of printers
- Remove Display in the Control Panel
- Hide the Screen Saver tab

- Hide the Appearance and Themes tabs
- Hide desired themes
- Remove Add/Remove Programs
- Hide Add/Remove Windows Components page
- Remove Support information

As you can see, you can configure many, many different policies on your local machine. The important point to remember is that you should only enable policies that you really want to enforce. Be wary of enabling too many settings that cause too many user restrictions and too many registry entries. They have a tendency to bog down your computer and be ineffective. Just because you can enable a policy doesn't mean you should, so your best approach to using Group Policy is to keep things simple and effective.

Chapter 3

Working with Applications

IN THIS CHAPTER

- Installing and Removing Applications
- Working with Application Compatibility
- Managing Applications

APPLICATIONS ARE AN OPERATING system's mainstay. Without applications to perform the tasks you need, your operating system doesn't do a whole lot on its own. You can surf the Internet, network with other computers, and perform standard kinds of operating system functions, but applications are the major reason to own a computer. Fortunately, installing and running applications on Windows XP is easier than on any other Windows operating system. Unfortunately, not all applications are compatible with Windows XP, and some of the older applications from your Windows 9*x* days simply are not going to work well. However, Windows XP includes more tools and features for installing and managing applications than ever before, and this chapter explores those tools and features.

Installing and Removing Applications

You can find just about any application you might want to use on Windows XP, from word processing to games. Just visit your local or online computer store and start browsing through the variety of titles available. However, the greatest mistake people often make is assuming that all software applications will work with Windows XP. Just because a software package says, "compatible with Windows" on the box does not mean that it is actually compatible with Windows XP. Software written for Windows 9*x* might not work with Windows XP at all, or if it does work, it may work intermittently. So, the number one rule of using applications on Windows XP, or any operating system for that matter, is to use applications that are written for Windows XP. This almost guarantees that you will have few, if any, problems. Fortunately, even if your favorite software is not explicitly written for Windows XP, Windows XP gives you a few tools and options that can help you manage it.

Like Windows 2000, Windows XP does not allow programs to alter operating system files or run in the operating system's memory space. Windows 9*x* sort of took an anything goes approach to software, making the operating system much more susceptible to aggravating system lockups. In Windows XP, lockups can still occur, but they are less frequent and usually easier to recover from than they were in Windows 9*x*.

Installing Software

Software is installed by launching a setup program, such as setup.exe. The setup program copies the software's files from a source to a folder on the computer's hard drive. The setup program can be launched from an Internet download or from an installation CD. Most software sold today has an autostart feature on the CD that walks you through the installation process. If an installation CD does not automatically start the installation, you can simply browse the CD and locate the setup program.

You can also use Add/Remove Programs in the Control Panel to install a program. You'll see an Add New Programs button on the left side of the screen, as shown in Figure 3-1. After you click the Add New Programs button, you can click the CD or Floppy button to begin an installation from a floppy disk or CD-ROM. You can also install programs that are available from a network share. If you want to download something from the Windows Update site, click the Windows Update button. Essentially, the Install option found here looks for setup.exe on the floppy disk or CD.

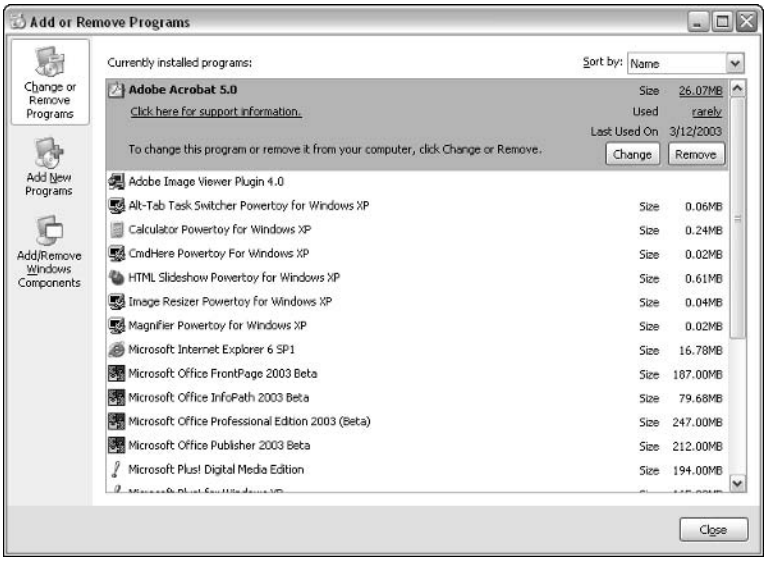
Add or Remove Programs
Change or Remove Programs
Add New Programs
Add/Remove Windows Components
Currently installed programs:
Sort by: Name
Adobe Acrobat 5.0
Size 26.07MB
Click here for support information.
Used rarely
Last Used On 3/12/2003
To change this program or remove it from your computer, click Change or Remove.
Change
Remove
Adobe Image Viewer Plugin 4.0
Alt-Tab Task Switcher Powertoy for Windows XP Size 0.06MB
Calculator Powertoy for Windows XP Size 0.24MB
CmdHere Powertoy For Windows XP Size 0.02MB
HTML Slideshow Powertoy for Windows XP Size 0.61MB
Image Resizer Powertoy for Windows XP Size 0.04MB
Magnifier Powertoy for Windows XP Size 0.02MB
Microsoft Internet Explorer 6 SP1 Size 16.78MB
Microsoft Office FrontPage 2003 Beta Size 187.00MB
Microsoft Office InfoPath 2003 Beta Size 79.68MB
Microsoft Office Professional Edition 2003 (Beta) Size 247.00MB
Microsoft Office Publisher 2003 Beta Size 212.00MB
Microsoft Plus! Digital Media Edition Size 194.00MB
Close

Figure 3-1: Add/Remove Programs.

There are two ways to remove a program from your computer. Some programs come with their own uninstall option. You just put the CD-ROM into the CD-ROM drive, let it automatically begin, and a window appears that allows you to install additional components or remove existing components—or the entire program. Microsoft Office is an example of a program that uses this feature. Some programs also have a built-in uninstall routine. You can click Start→Programs, and then point to the program's folder and a menu pops out with an uninstall option.

If you have a program that doesn't help you with the uninstall, you can use Add/Remove Programs in the Control Panel. When you open Add/Remove Programs, you see a list of programs. The programs listed in this window are installed on your computer. To remove one of them, simply select it and click the Change/Remove button. Follow any additional prompts that appear.

Some programs give you a Change button and a Remove button, while some only give you a Change/Remove button. If you have programs that can be upgraded, or if additional parts of the program can be installed, you'll see both Change and Remove. This allows you to install additional portions of the program, or simply remove the program from your computer.

What do you do if you simply can't get rid of a program? There is no uninstall option on the CD-ROM, and the program is not listed in Add/Remove Programs as an option you can uninstall. Although this normally does not happen, you can still remove the program by deleting its folder. This is not a recommended action because you may experience problems due to leftover application files. For example, if other applications use the application files you want to delete, you might have problems with other applications working after these files are deleted, and this action does not remove registry settings. However, this option can be used when absolutely necessary. Just follow these steps:

1. Open My Computer, then double-click your C: drive icon.
2. Locate a folder called Program Files and double-click it. You may need to click the View All Contents link as prompted.
3. Look through the folders and find the one that has the program you want to uninstall. Typically, the name of the folder will say the program's name or the manufacturer's name.
4. When you have found the folder, right-click it and click Delete to remove it from your computer. Make sure you are deleting the correct folder before completing the action.

Using Applications Not Written for Windows XP

Windows XP includes a new feature, called Compatibility Mode, that allows Windows XP to act like a previous version of Windows (specifically, Windows 95, 98, Me, NT, or 2000). The purpose of Compatibility Mode is to allow you to use older applications that might not work with Windows XP. When in Compatibility Mode, Windows XP acts like the version of Windows you select so that the application is tricked into thinking it is installed on the correct operating system. In this way, you can use older applications that are not 100 percent compatible with XP.

It is important to note that Compatibility Mode is intended for standard applications and even games. However, Compatibility Mode is not designed for use with programs that run portions of your system configuration. For example, antivirus programs that are incompatible with Windows XP should not be used because the program might damage your system in Compatibility Mode. The same is true for disk management utilities and backup software. In other words, if the application is used to manage the operating system or a portion of the operating system, it should not be used with Compatibility Mode—you need to upgrade and get the compatible version of the software.

Windows XP's compatibility functions use application database files that interact with programs that you install. Because programs are outside of the operating system kernel, the application database files are used as a translator for the program and the operating system. These fixes, which are also called *shims*, are held in this database file, which contained about 200 at the time of XP's release. Shims can be used by any application, but third-party developers cannot write new shims for Windows XP. This is a security protection feature that Microsoft implemented. What you get out of the box is all you get. The compatibility modes and shims provided with Windows XP support around 100 of the most popular programs so they can work with Windows XP. However, they do not support everything, and they certainly don't support any custom applications. However, you can still try to use one of these applications with Compatibility Mode and you might have good results. Be sure to use Windows XP's dynamic update and Windows update from time to time to ensure that your XP system has all of the available shims in its database.

With shims, Windows XP can invoke several compatibility modes. Essentially, a compatibility mode enables XP to use the identified shims for that category and fix the application compatibility problems that the program has with Windows XP. These shims emulate the operating system that is needed by the program. For

example, if an application is written for Windows 98, the shims can emulate the structure of the Windows 98 registry, the location of certain system and user folders, file paths, and related changes in the operating system that the application would not be able to handle. The compatibility modes available in Windows XP are as follows:

- **Windows 95** – Emulates the Windows 95 environment.
- **Windows 98/Me** – Emulates the Windows 98/Me environment.
- **Windows NT 4.0** – Emulates the Windows NT 4.0 environment.
- **Windows 2000** – Emulates the Windows 2000 environment.
- **256 colors** – Reduces video card color to 256 colors for applications that can only handle 256 colors.
- **640 × 480 Screen Resolution** – Restricts screen resolution to 640 × 480 for applications that can only handle that screen resolution.
- **System Modes** – A few other modes are available that power users and administrators can invoke. These modes are used to limit or manage security and profiles for the user to run programs that require a limited security context.
- **Custom Modes** – You can create a custom mode for a particular application, based on the application's needs using the Compatibility Administrator tool, explored later in this chapter.

Using the Program Compatibility Mode Wizard

You can easily configure a program to run in Program Compatibility Mode with the help of the Program Compatibility Mode Wizard. The following steps show you how to use the wizard:

1. Click Start → All Programs → Accessories → Program Compatibility Wizard.
2. The Program Compatibility Mode Wizard appears. Click Next on the Welcome screen.
3. In the next window, choose the desired radio button to locate the program, shown in Figure 3-2. Make your selection and click Next.

Help and Support Center
Back
Index
Favorites
History
Support
Options
Search
Set search options
Help and Support Center
Windows XP Professional
Program Compatibility Wizard
How do you want to locate the program that you would like to run with compatibility settings?
I want to choose from a list of programs
I want to use the program in the CD-ROM drive
I want to locate the program manually
< Back
Next >
Cancel

Figure 3-2: Choose a program option.

4. In the next window, choose the operating system that you want to emulate, such as Windows 95, NT 4.0, Windows 98/Me, and so on.
5. In the next window, you can choose the screen resolution that the program works best under, or you can choose to disable Windows visual themes, which can interfere with some older programs. However, the settings here typically apply to games and educational programs that use a lot of graphics. If you do not want to use any of the settings, simply click Next without selecting any items.
6. In the next window, click Next to test the compatibility settings with the program.
7. The program opens and runs. Use the program for a few minutes to see if the program works correctly. Then close the program to return to the wizard.
8. The wizard asks you if the program works correctly. If so, click Yes to continue, or No to try different compatibility settings. Click Next.
9. The Program Compatibility Wizard collects information about your program and provides you with a dialog box so that you can send compatibility information to Microsoft. Click Yes or No and click Next.
10. Click Finish. To change settings at a later time, simply rerun the wizard. You can now open the program and use it normally.

Running 16-bit and MS-DOS Applications

Windows XP has the capability to run old 16-bit applications and MS-DOS applications (which are also 16-bit applications) that were originally developed for Windows 3.*x*. Basically, all programs sold today are 32-bit applications, but your environment may have a custom application that was developed years ago that management still wants to use on Windows XP. To run 16-bit applications, Windows XP starts a *virtual machine*, which is a subsystem designed to mimic the Windows 3.*x* environment so that these applications can run. The subsystem places the 16-bit application in its own virtual machine, or memory space, so that the application runs without interfering with other applications on Windows XP, in theory anyway.

You can avoid having to use the Program Compatibility Wizard and more easily apply a compatibility mode to a program by right-clicking the program's executable file and clicking Properties. You see a Compatibility tab, as shown in Figure 3-3. Simply choose to run the program in compatibility mode, choose an operating system to emulate, and apply any display settings, as needed.

PowerToy Calculator Properties
General
Shortcut
Compatibility
Security
If you have problems with this program and it worked correctly on an earlier version of Windows, select the compatibility mode that matches that earlier version.
Compatibility mode
Run this program in compatibility mode for:
Windows 2000
Display settings
Run in 256 colors
Run in 640 x 480 screen resolution
Disable visual themes
Learn more about program compatibility.
OK
Cancel
Apply

Figure 3-3: The Compatibility tab.

Using Additional Compatibility Tools

Aside from using the basic program compatibility settings to run an application, you can also configure some custom settings, or at least attempt to use a few compatibility tools that can make an application or program work with Windows XP, namely the Compatibility Administrator tool. The tools explored in the following sections are designed for administrators, and they can be complicated. However, with a little work, you may be able to solve compatibility problems with troublesome programs.

To access the additional compatibility tools, you'll need to download the Application Compatibility Toolkit (version 3.0 at the time of this writing) from `http://msdn.microsoft.com`. After you download and install the toolkit, you'll see an HTML page that outlines the documents and tools in the toolkit. If you click on the Application Compatibility Tools link, you'll be able to see the three tools summarized in the following sections. Be sure to use the Help files within each tool to learn more.

Application Compatibility Analyzer

The Application Compatibility Analyzer is a tool that collects application information from computers, along with identifying machine information. Its main purpose is to automate the process of collecting an inventory of applications used across all of the machines in an organization; therefore, it is primarily used by IT administrators managing Windows networks. Once data is collected, the tool can generate reports about application data by departments or computers, or can locate the number of instances of a certain application across an organization. The tool contains two pieces: the Collector tool (collector.exe), which is run on the client computers to gather and log the data, and the Analyzer Tool (analyzer.exe), which merges all of the data collected. The tools are HTML-based and work like Web page wizards.

Application Verifier

The Application Verifier tool, which was designed for developers, is used to locate difficult problems with applications. Specifically, it helps software developers identify subtle or minor problems with an application. Because this tool was designed for software developers, it doesn't provide any direct help to users.

Compatibility Administrator

The Compatibility Administrator is designed for administrators and gives you the ability to determine the correct combination of compatibility fixes needed to support an application on Windows XP. The fixes are then applied through the

single-compatibility interface. In short, this is the tool you need to use if you are having problems getting a certain application to work on Windows XP. Note that this tool doesn't guarantee compatibility, but it can give you a greater chance for application compatibility when the Program Compatibility Wizard has not helped. This tool can do the following:

- Test applications with compatibility modes
- Test individual compatibility fixes
- Create custom compatibility modes and databases and related tasks

To run the Compatibility Administrator, click Start → All Programs → Microsoft Windows Application Compatibility Toolkit → Compatibility Administrator Tool (see Figure 3-4).

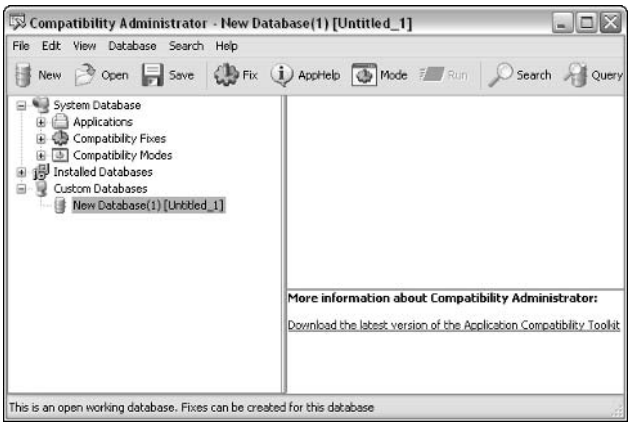
Compatibility Administrator - New Database(1) [Untitled_1]
File Edit View Database Search Help
New Open Save Fix AppHelp Mode Run Search Query
System Database
Applications
Compatibility Fixes
Compatibility Modes
Installed Databases
Custom Databases
New Database(1) [Untitled_1]
More information about Compatibility Administrator:
Download the latest version of the Application Compatibility Toolkit
This is an open working database. Fixes can be created for this database

Figure 3-4: Compatibility Administrator.

The left pane lists all of the applications that are supported by fixes in Windows XP. As you scroll through the list by expanding applications, you can see there are quite a number of them. In the right pane, you can select one of the applications and see the executable file the fix applies to and the actual compatibility fixes that are applied to this application by default. You also see the file-matching results ensuring that the executable is the correct one for the application, as shown in Figure 3-5.

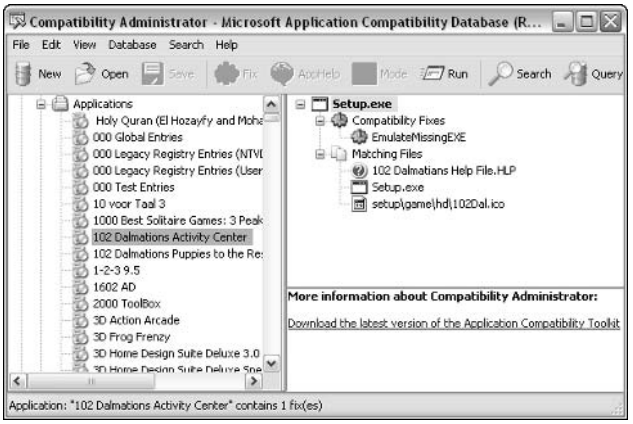
Compatibility Administrator - Microsoft Application Compatibility Database (R...
File Edit View Database Search Help
New Open Save Fix AppHelp Mode Run Search Query
Applications
Holy Quran (El Hozayfy and Moha
000 Global Entries
000 Legacy Registry Entries (NTVI
000 Legacy Registry Entries (User
000 Test Entries
10 voor Taal 3
1000 Best Solitaire Games: 3 Peak
102 Dalmations Activity Center
102 Dalmations Puppies to the Re
1-2-3 9.5
1602 AD
2000 ToolBox
3D Action Arcade
3D Frog Frenzy
3D Home Design Suite Deluxe 3.0
Setup.exe
Compatibility Fixes
EmulateMissingEXE
Matching Files
102 Dalmatians Help File.HLP
Setup.exe
setup\game\hd\102Dal.ico
More information about Compatibility Administrator:
Download the latest version of the Application Compatibility Toolkit
Application: "102 Dalmations Activity Center" contains 1 fix(es)

Figure 3–5: Applications and fixes.

If you are having a hard time browsing the applications and fixes, you can control how much information is displayed using the View menu. By default, compatibility fixes, compatibility modes, Apphelp entries, and applications patches are all displayed. If you just want to see how patches are applied, you can clear the check next to the other items and the view will be a lot easier to work with.

You can perform several important actions with the Compatibility Administrator. First, you can disable fixes. Keep in mind that the application databases provide information about applications Microsoft has determined fixes for and the fixes that should be applied. When a user invokes the Application Compatibility Wizard, a match for that application under the desired Windows version is attempted. However, you may need to change this behavior for a particular application. You can use the default fixes assigned by the database and overlayed with the chosen operating system, you can remove them and apply your own, or you can simply add to the existing one. You can also disable the default database fix for an application, and then use the tool to create your own fix. Then that fix can be run or even deployed. Disabling a fix disables it on the local system but does not delete it; you can easily reenable the fix at a later time.

One of the most powerful options that Compatibility Administrator provides is to enable you to create custom databases and custom fixes for the applications, as needed. When you first open Compatibility Administrator, a new database is created for you and appears in the lower-left portion of the screen. By default, this database is named New database(1).sdb. You can use the Database menu to rename the database, as desired. You can also perform a few additional actions using the Database menu that specifically allow you to create custom fixes for your new database.

Aside from creating custom fixes from this window, you can also create your own compatibility mode. For example, say that your environment has several custom applications. You could create a custom fix for those applications by creating your own custom compatibility mode. Then the mode could more easily be applied to the desired applications.

Once you have created the custom fixes and/or compatibility modes for your custom database, you can deploy that database to other Windows XP machines. In a sense, this is misleading because the console doesn't actually help you deploy the SDB database file that you created. You save it in the console, and then simply copy the SDB database file to the desired Windows XP computers. You can deploy the file using a simple network share, floppy disk, or whatever works best for you. The point is that the console doesn't provide a delivery method. After the file is located on the other XP machines, simply run the SDB file on those machines, and Windows XP will register the new database.

Obviously, the Compatibility Administrator is a complex tool, so if you are interested in using it, make sure you study the Help files, which will give you detailed instructions and steps for completing various tasks.

Managing Application Performance

Aside from getting applications to work with Windows XP, perhaps one of the greatest program issues you are likely to be concerned with is performance. Certain applications run slowly on Windows XP, or, generally, all applications run slowly. Fortunately, the potential performance problems are usually easy to spot, but solving them can be another story because you are limited in what you can do.

First of all, it is important to check hardware requirements. As with most other things in the computing world, you can't run software on a computer that does not have the required system hardware; at least you can't run software effectively. In truth, many applications and even games today require fast processors and plenty of RAM. This is especially true of photo and video production applications that have become so popular in the past few years. The simple reality is that the computer should exceed any minimum hardware requirements as posted by the software manufacturer. If the hardware requirements are not met, the application may run, but probably very slowly. In this scenario, your only real option is to upgrade the computer's hardware.

Another issue concerning performance comes back to compatibility. You might be able to get an incompatible application to run using the Program Compatibility Mode, but that application still might not run as fast or perform as well as you would like. This is simply a problem with compatibility for which there is no good solution, except to upgrade to a compatible application.

Windows XP does have a couple of settings to make sure Windows XP is optimized for applications. The correct settings are actually configured by default, but if you are having a lot of performance problems with programs, you should check these settings. Right-click My Computer, click Properties, and then click the Advanced tab. Click the Settings button under Performance and the Performance Options dialog box appears. Click the Advanced tab, shown in Figure 3-6. The Processor scheduling and Memory usage settings should both be set to Programs. If they are not, select the Programs buttons and click OK.

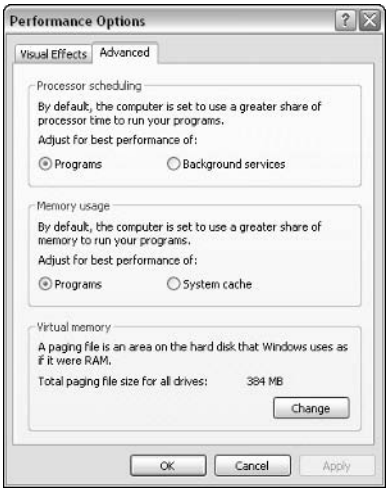
Performance Options
Visual Effects
Advanced
Processor scheduling
By default, the computer is set to use a greater share of processor time to run your programs.
Adjust for best performance of:
Programs
Background services
Memory usage
By default, the computer is set to use a greater share of memory to run your programs.
Adjust for best performance of:
Programs
System cache
Virtual memory
A paging file is an area on the hard disk that Windows uses as if it were RAM.
Total paging file size for all drives:
384 MB
Change
OK
Cancel
Apply

Figure 3-6: Performance Options.

Why would anyone change these settings? If you were to use Windows XP Professional on a network as a file server or print server, you could change these settings to boost background services and give more memory to the System Cache (which would be needed in this case). In a normal operating mode where XP is used as a standard desktop computer, though, this setting should always be set to Programs.

Managing Applications and Solving Problems

If you used Windows 9*x*, you are probably familiar with the common application lockups and crashes that happened frequently. Unfortunately, Windows XP is not immune from this behavior, but it happens much less frequently. Once again, if you are using applications that are not quite compatible with Windows XP, you are more likely to experience problems than when using applications that are designed for Windows 2000/XP.

As with previous versions of Windows, your main tool for controlling applications and getting control of the operating system when something goes wrong is Task Manager. To use Task Manager, press CTRL+ALT+DEL. Task Manager should appear; if it does not, click the Task Manager button. You'll see the Windows Task Manager dialog box, as shown in Figure 3-7. On the Applications tab, you will see all applications that are currently open and their status (running, failed, and so on). To stop an application from running, select the application in the list and click End Task.

Figure 3-7: Task Manager.

You can also use the Processes tab found in Task Manager to end application processes or set application priority. If you click the Processes tab, you can right-click an executable that is running and point to Set Priority, then select a different priority for the application. The following priorities are available:

- **Realtime** – The Realtime priority allows an application to have total control over all system resources. This can make the process run much faster, but it has the potential to crash your system. As a general rule, avoid this setting.
- **High** – The High priority gives a process priority over all other applications. This might make the process run faster, but it could interfere with other processes running on your computer. Use this setting with caution.

- **AboveNormal** – This option gives a process slightly more priority than other processes. This can help speed up an application, but it can slow other applications down.
- **Normal** – This is the default setting.
- **BelowNormal** – This setting causes the process to run more slowly than other applications that are open.
- **Low** – This option gives other processes more priority than this process.

Should you adjust the priority settings for applications? As a general rule, the answer is no. Windows XP does a good job of managing application priority, but if you have several applications running and you want to make one run a bit faster than the others, try giving the application an AboveNormal priority to see if this helps performance. Keep in mind that the priority settings may work differently with various applications, so you'll need to experiment to see if you get any real gains in performance.

Managing Automatic Updates

Windows XP supports the Automatic Updates feature, which allows Windows XP to check the Windows Update Web site periodically for updates to Windows XP. Depending on your configuration, Windows XP can automatically download and install updates without an intervention from the user. However, you might not want Windows XP performing this task automatically, in which case, you can manage the updates manually.

If you open System Properties and access the Automatic Updates tab, shown in Figure 3-8, you can choose one of three options:

- **Download the updates automatically and notify me when they are ready to be installed** – This option automatically downloads the updates and prompts you that they are ready to be installed. At this time, you can choose to install the updates or decline the install.
- **Notify me before downloading any updates and notify me again before installing them on my computer** – This option lets you know when an update is available. You can then choose to download and install it.
- **Turn off automatic updating. I want to update my computer manually** – If you do not want Windows XP checking for updates automatically, use this option. You can then manually check for updates when convenient by clicking Start → All Programs → Windows Update. Note that you also have the option to restore updates that you have previously declined.

System Properties
General
Computer Name
Hardware
Advanced
System Restore
Automatic Updates
Remote
How do you want to be notified when updates are available for your computer?
Notification Settings
Download the updates automatically and notify me when they are ready to be installed.
Notify me before downloading any updates and notify me again before installing them on my computer.
Turn off automatic updating. I want to update my computer manually.
Previous Updates
You can choose to have Windows notify you again about updates you previously declined.
Restore Declined Updates
OK
Cancel
Apply

Figure 3-8: System Properties.

Programs and Users

If several people use your computer, you may not want them to have the ability to add or remove programs. This could be true with a home computer used by several different people, or one used at your office. As the computer administrator, you can control the installation and removal of programs using Windows XP user accounts, as well as local group policy.

Windows XP User Accounts

Windows XP provides local user accounts as Administrator accounts and Limited accounts. Limited accounts cannot make changes to hardware or system configurations. They are also limited when installing programs. Depending on your needs, consider giving most users only Limited accounts locally on Windows XP, with only key users having Administrative accounts on the computer. This can greatly cut down on problems because Windows XP prevents Limited accounts from doing anything drastic, including program management. However, some older programs might not work well when users are logged on with Limited accounts, so keep this in mind as you experiment with older programs. If you are in a domain environment, domain administrators can manage domain user accounts in such a way that users are limited from installing programs as well. See Chapter 2 to learn more about managing user accounts.

Local Group Policy

On Windows XP Professional, a local computer administrator can also enforce local Group Policy on other users who log on to the computer. (See Chapter 2 for more information about local Group Policy.) This is yet another way to control what users can and cannot do on the computer, including software installation and removal. Using local Group Policy, you can invoke a setting that removes Add/Remove Programs from the Control Panel that will further limit what users can do. The following steps walk you through this process:

1. Log on to a Windows XP Professional computer with a local administrator account.
2. Click Start → Run. Type **MMC** and click OK.
3. In the MMC window, click File → Add/Remove Snap-in.
4. In the Snap-in window, click Add.
5. In the Snap-in dialog box, select Group Policy and click Add. A window appears asking if you are using local Group Policy. Click OK and click Close.
6. The Group Policy console is now available, as shown in Figure 3-9.

Figure 3-9: Local Group Policy.

7. Expand User Configuration → Administrative Templates → Control Panel → Add/Remove Programs. Open the Remove Add/Remove Programs Properties and enable it, as shown in Figure 3-10.

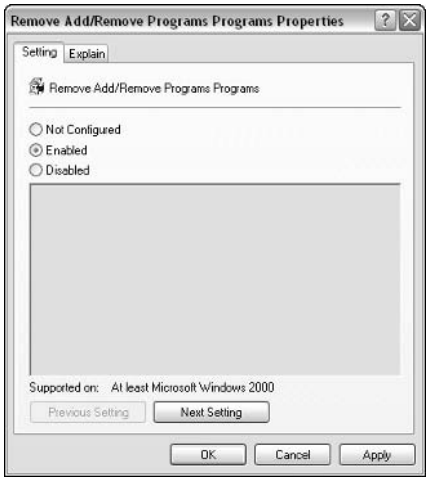

Figure 3-10: Add/Remove Programs Policy.

8. Click OK and close the Group Policy console.

Chapter 4

Using Digital Media on Windows XP

In This Chapter

- Using Windows Media Player 9
- Using Windows Movie Maker 2
- Managing digital photos

DIGITAL MEDIA HAS BECOME an integrated part of our lives. From digital photos to movies to music, digital media is here to stay, and consumers are demanding more from computer operating systems for digital media management. Windows XP provides some helpful tools for digital media management. This chapter covers Windows Media Player 9, Windows Movie Maker 2, and several tools for managing and using digital photos.

Windows Media Player 9

Windows Media Player 9 contains improvements and updates from the previous version of Media Player included with Windows XP, Media Player 8. If you have Media Player 8 installed on your Windows XP computer, you can download Media Player 9 for free from `www.microsoft.com/windowsxp` and install it on your computer. Like Media Player 8, Media Player 9 provides you with a primary media area, a list of buttons on the left side of the Media Player window (called Features), and a standard toolbar. When you first open Media Player, it attempts to connect to `www.windowsmedia.com` (called the Media Guide). If successful, you'll see a media interface, as shown in Figure 4-1. If you're not connected to the Internet, you'll first see a URL error page.

You use the features of Media Player by accessing the different buttons on the left side of the interface. The following sections show you what is available.

Now Playing

Now Playing lists or shows the type of media you are currently playing. Most types of media will automatically launch Windows Media Player. Any media that you play, such as music or a movie, appears in the Now Playing area. For example, as

shown in Figure 4-2, if you play music, you'll see the CD, names of the songs, and a visualization, which moves to the beat of the music. Note that the CD cover and the CD music list are downloaded from the Internet, so if you don't have an Internet connection, these two items will not appear.

Figure 4-1: Media Player connects to Windows Media.

Figure 4-2: The Now Playing area.

In the same way, movies that you play are shown in the Now Playing area as shown in Figure 4-3. If information about the movie clip is available, it will appear in the Now Playing area as well.

Figure 4-3: Any media appears in the Now Playing area.

You can configure the Media Player window so that it suits your needs, and you'll want to get familiar with these controls because they can easily help you customize the Now Playing area. First, in the lower-right corner of the Media Player window, you see the following three buttons:

- **Maximize the Video and Visualizations Pane** – This option maximizes the area of the Now Playing window that displays video or visualizations. After you click this option, you don't see the album and song list or movie info pane.
- **View Full Screen** – This option allows you to view the Now Playing area full screen on your computer, which can be helpful if you are watching a movie clip.
- **Select Playlist Options** – This shows or hides the playlist in the Now Playing window. If you are listening to a music CD, the songs on the CD are displayed in the Now Playing window if this option is enabled.

If you look toward the play controls at the bottom left of the player, you also see the following:

- **Shuffle** – This button shuffles your current playlist. This feature is cool if you want to play a music CD and hear the songs in a different order.
- **Change Player Color** – This option lets you quickly change the player's color.
- **Switch to Skin Mode** – This option switches to skin mode, which is explored later in this chapter.

A drop-down menu in the upper-right corner can also be used to select different media to play. Or, you can click the arrow on the Now Playing button and access the same options. This feature easily helps you access media in your Media Library. Use the standard buttons at the bottom of the Media Player window to play the media, stop playing the media, adjust the volume, or use related stereo or video controls. You can find these same controls in the Play menu at the top of the interface.

Aside from the immediate options on the interface, you can use the View menu to change a number of items affecting the Now Playing area's interface. The following list tells you what options are available to you and what they do:

- **Full Mode** – The default display is shown to you in full mode. If you switch to compact mode, use this option to return to full mode.
- **Skin Mode** – This option gives you a smaller interface. You have the same options, but some of them appear as pop-out menus. This option takes up less room on your desktop. If you are in full mode, click this option to move to compact mode.
- **Now Playing Options** – This option provides a pop-out menu where you can manage the look of the Now Playing window.
- **Show Title** – This is the same as the button option found directly on the interface. It shows the title and the playlist option.
- **Show Media Information** – This displays title information about the media (such as the artist and songs, name of the video, and so on).
- **Show Playlist** – For music media, this option shows the list of songs on the CD or the playlist you have created.
- **Show Resize Bars** – Resize bars appear between the different options you elect to show in the Now Playing area. The resize bars enable you to adjust the size of the components, as desired.
- **Visualizations** – You can choose from different visualizations here. You can also change the visualization directly from the Now Playing area by clicking the arrow buttons found under the graphical visualization window.

- **Info Center View** – This option displays the info center, which downloads information about the media being played from the Internet.
- **Plug-Ins** – Some media may require a plug-in, which is a small software program designed to work with Media Player. The Plug-Ins menu option allows you to see what plug-ins are installed and gives you some additional options for locating and managing plug-ins.
- **Enhancements** – The Enhancements option allows you to use some equalizer and volume management features, as well as Video Settings when you are playing video. If you point to Enhancements and click Show Enhancements, you can see a graphic equalizer in the Now Playing area so you can adjust the sound, as shown in Figure 4-4.

Figure 4-4: You can add an equalizer using the Enhancements option.

- **Statistics** – When playing videos, access this option to view statistics about the video transmission quality. The statistics window can be particularly helpful when troubleshooting problems with streaming media.
- **Full Screen, Refresh, and Video Size** – The final options in the View menu provide basic viewing capabilities.

Media Guide

The next feature in Media Player is the Media Guide, mentioned earlier in this chapter. This option connects you to WindowsMedia.com, where you can download all kinds of music and movie files. This is a fun Web site, so *do* check it out. You must be connected to the Internet for the Media Guide to work.

Copy from CD

The Copy from CD feature, shown in Figure 4-5, gives you information about the music CD to which you are currently listening. You are given the names of the songs, their length, and standard information about the album. This information only appears, however, if you are connected to the Internet.

Windows Media Player
File View Play Tools Help
Lucky Town
Bruce Springsteen - Lucky Town
Copy Music
Find Album Info
View Album Info
Now Playing
Media Guide
Copy from CD
Media Library
Radio Tuner
Copy to CD or Device
Premium Services
Skin Chooser
Title Length Copy Status Artist Composer Genre Style Data
1 Better Days 4:08 Bruce Springsteen Bruce Springsteen Rock Rock AMG
2 Lucky Town 3:27 Bruce Springsteen Bruce Springsteen Rock Rock AMG
3 Local Hero 4:04 Bruce Springsteen Bruce Springsteen Rock Rock AMG
4 If I Should Fall Behind 2:57 Bruce Springsteen Bruce Springsteen Rock Rock AMG
5 Leap of Faith 3:27 Bruce Springsteen Bruce Springsteen Rock Rock AMG
6 The Big Muddy 4:06 Bruce Springsteen Bruce Springsteen Rock Rock AMG
7 Living Proof 4:49 Bruce Springsteen Bruce Springsteen Rock Rock AMG
8 Book of Dreams 4:24 Bruce Springsteen Bruce Springsteen Rock Rock AMG
9 Souls of the Departed 4:18 Bruce Springsteen Bruce Springsteen Rock Rock AMG
10 My Beautiful Reward 3:55 Bruce Springsteen Bruce Springsteen Rock Rock AMG
10 track(s) checked to copy to C:\Documents and Settings\Curt Simmons\My Documents\My Music
Artist: Bruce Springsteen
00:17

Figure 4-5: Copy from CD.

In the upper-right corner of the interface, you see the Find Album Info and View Album Info buttons. You can click these buttons to get additional information from the Internet about the album. Sometimes this feature gives you additional information, sometimes not, depending on how the album is listed, as shown in Figure 4-6.

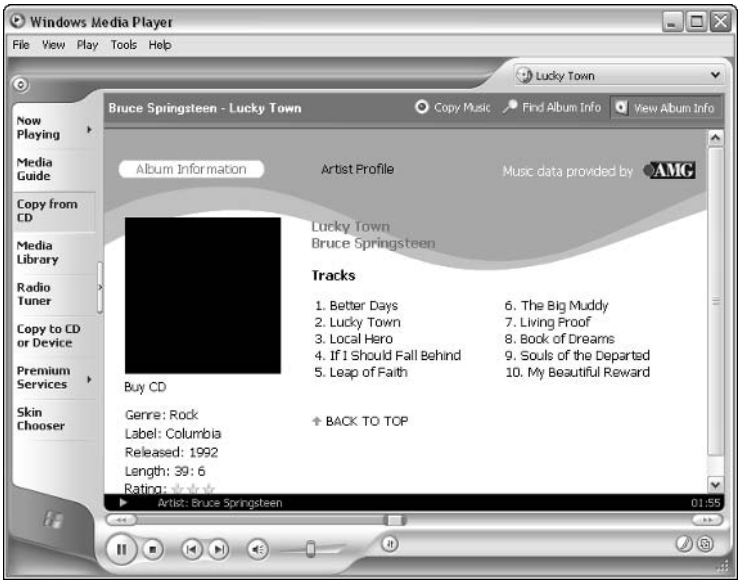

Figure 4-6: View Album Info.

You also see a Copy Music button. You can copy any music track from a music CD to store the track on your hard drive. This feature has two benefits. First, you can store songs you really like directly on your hard disk so that Media Player can play them without the music CD. Also, you can generate your own collection of favorites and create a playlist (which you learn about later in this chapter).

To make a copy of a song from a CD, just follow these steps:

1. In Media Player, click the Copy from CD feature button.
2. In the list of songs, clear the check boxes next to the song(s) you do not want to copy. In other words, any songs with the check box enabled will be copied to your hard disk.
3. Click the Copy Music button. Depending on your configuration, you may be able to hear the song while it is being copied. The feature area shows you the progress of the copy as it occurs.
4. Once the copy is complete, the song is placed in your Media Library (explored in an upcoming section).

You can also control how songs are recorded and managed by clicking the Tools menu in Media Player, and then clicking Options. Click the Copy Music tab, shown in Figure 4-7. Under most circumstances, the default options configured on this tab are all you need, but you might encounter instances when you want to change the default behavior.

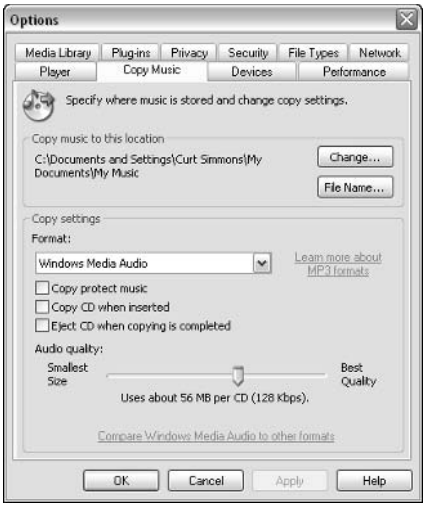

Figure 4-7: Copy Music option tab.

The following options are found on this tab:

- **Copy music to this location** – By default, the location is C:\My Documents\My Music. If you want to change this default location, click the Change button and select a different folder on your computer's hard drive.
- **Copy settings** – You can choose to copy music in either the Windows Media format or MP3 – the choice is yours. The Copy protect music check box simply means that Windows Media Player is keeping a license for you to copy the music and play it on your computer. It is illegal for you to e-mail copies of music to other people, however. Finally, you can choose to copy music at different quality settings by adjusting the slider bar. The higher the quality you copy, the greater the hard drive space that is consumed. Even at a lower quality, several megabytes of storage space will be needed for only a few songs.

Media Library

The Media Library is a library designed to hold media. All of your saved music and video files are stored in the library under different categories so you can easily access them, as shown in Figure 4-8.

Windows Media Player
File View Play Tools Help
Lucky Town
Playlists Queue-It-Up Search Add View Album Info
Now Playing
Media Guide
Copy from CD
Media Library
Radio Tuner
Copy to CD or Device
Premium Services
Skin Chooser
I Hope You Dance
Now Playing
All Music
Artist
Album
I Hope You Dance (Lee Ann Womack)
What Kind of Love (Margaret Becker)
Genre
All Video
Other Media
My Playlists
Curt
Like Humans Do (radio edit)
Sample Playlist
Auto Playlists
Radio
Premium Services
Title
Artist
1 The Healing Kind Lee Ann Womacl
2 I Hope You Dance Lee Ann Womacl
3 After I Fell Lee Ann Womacl
4 Stronger Than I Am Lee Ann Womacl
5 I Know Why the River Runs Lee Ann Womacl
6 Why They Call It Falling Lee Ann Womacl
7 Ashes By Now Lee Ann Womacl
8 Thinkin' With My Heart Again Lee Ann Womacl
9 I Feel Like I'm Forgetting Something Lee Ann Womacl
10 Lonely Too Lee Ann Womacl
11 Does My Ring Burn Your Finger Lee Ann Womacl
12 Lord, I Hope This Day Is Good Lee Ann Womacl
12 Items
Total Time: 43:39 / 40.26MB
Artist: Bruce Springsteen
00:22

Figure 4-8: Media Library.

On the left side of the interface, you see various categories. Click a category, and you can see the songs or videos in your library for that category. For example, when I expand Album, I can select an album and see a list of songs I have copied to my computer from that album in the right pane. Just double-click a song or video clip to hear it or see it. Keep in mind that the library's purpose is to help you keep track of files that you want. The Media Library is able to detect the type of multimedia you are using and add it to the appropriate location in the library. You can search your library by clicking the Search button at the top of the interface, and you can perform standard add, remove, and delete functions.

You can also use the Media Library to create a playlist of your favorite tunes or videos. To add a new item to the Media Library, click the Add button (plus sign) on the interface. A submenu pops out that enables you to add a track that is currently being played, a file, or media found on the Internet. If you want to add a file, a typical browse window appears for locating the file you want to add. If you want to add something from the Web, a window appears in which you can enter the URL of the media item.

You can also use Media Player to create a playlist. A playlist is a collection of media that you can use or view on Windows Media Player. The major way media lists are used is to combine different songs from different sources into one list that you can then listen to or burn to a CD. To create a media list, follow these steps:

1. In the Media Library, click the Playlists button and click New Playlist from the menu that appears.
2. Enter a name for the new playlist in the dialog box that appears, shown in Figure 4-9.
3. In the left pane, choose to access media in the Media Library by artist, album, and so on from the drop-down menu. Then, click the desired media to add it to your playlist. You can simply browse through all of your media and generate a custom playlist this way. When you're done, click OK.

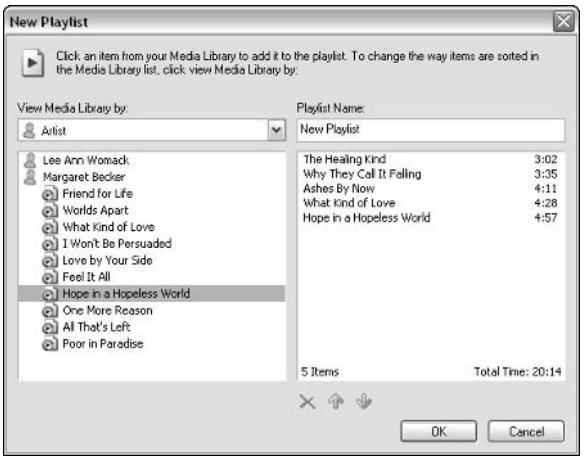
New Playlist
Click an item from your Media Library to add it to the playlist. To change the way items are sorted in the Media Library list, click view Media Library by.
View Media Library by:
Artist
Playlist Name:
New Playlist
Lee Ann Womack
Margaret Becker
Friend for Life
Worlds Apart
What Kind of Love
I Won't Be Persuaded
Love by Your Side
Feel It All
Hope in a Hopeless World
One More Reason
All That's Left
Poor in Paradise
The Healing Kind 3:02
Why They Call It Falling 3:35
Ashes By Now 4:11
What Kind of Love 4:28
Hope in a Hopeless World 4:57
5 Items
Total Time: 20:14
OK
Cancel

Figure 4-9: You can easily create a playlist.

You can import playlists from other locations, such as those found on Web sites, by first downloading the playlist to your computer and then using File→Import Playlist in Windows Media Player. In the same manner, you can export your playlists using File→Export Playlist so you can share your playlists with others, as well.

Radio Tuner

The Radio Tuner, shown in Figure 4-10, accesses Internet radio. With a good Internet connection, you can listen to radio stations all over the world that stream data over the Internet. Note, however, that dial-up connections will give you sporadic results, so Internet radio is a feature best used with broadband Internet connections.

Figure 4–10: Radio Tuner.

The Radio Tuner interface has two basic elements — Stations and Search. The following two sections show you how to use each. In the Stations section of the interface, you see a drop-down menu where you can select preset options. Windows Media Player gives you a list of a few popular Internet radio sites to pick from. If you want to reach one of these, double-click the name in the list to connect to the site. You can create your own preset radio stations by renaming the drop-down window My Stations. Use the Edit, Add, and Remove buttons to manage your station list. However, you can't add any stations to the list until you have located one using the Station Finder.

You locate Internet radio stations using the Station Finder window. To find a particular station, click the desired category button, or you can browse the stations by category (such as rock, gospel, jazz, and so on). When you find a station you want, just double-click it in the list — you will then be connected and be able to listen to the station. If you want to save the station, click Add to My Stations to add the station to your presets.

Copy to CD or Device

The Copy to CD or Device feature, shown in Figure 4-11, provides an easy way to copy files from your Media Library to a portable device, such as a Palm unit, a CD, or even to a remote storage media, such as a Zip or Jaz disk. Use the drop-down menu to select the device you want to copy to, and then select the items you want to copy. Finally, click the Copy button. Your specified items are copied and you can now use them on your portable device.

Windows Media Player
File View Play Tools Help
No Disc in Drive
Copy "Curt" to "Removable Disk (E:)"
Copy
Now Playing
Media Guide
Copy from CD
Media Library
Radio Tuner
Copy to CD or Device
Premium Services
Skin Chooser
Items to Copy
Edit Playlist
Items on Device
Curt
Removable Disk (E:)
Title Status Length Size
Friend for Life May not fit 4:57 4.56MB
I Won't Be Persuaded May not fit 5:42 5.26MB
Feel It All May not fit 4:34 4.22MB
One More Reason May not fit 4:55 4.53MB
Stronger Than I Am May not fit 3:37 3.34MB
Ashes By Now May not fit 4:11 3.86MB
Title Size
There are no items on the CD or device.
6 Item(s), Total Time: 27:59, 25.80MB
0 bytes / 0 bytes (0 bytes free space)

Figure 4-11: Copy to CD or Device.

Premium Services

The Premium Services option is simply a connection to an Internet site where you can sign up to have digital media, such as music and movies, delivered to you for a fee. Just click one of the options if you want to get more information. You'll need an Internet connection for any of these features to work.

Skin Chooser

Media Player includes a number of different *skins* – or interface overlays – you can apply to Media Player. These skins give Media Player completely different looks, which you may find very appealing. These are just for fun – you still have the same functionality in Media Player, regardless of what skin you choose to use. To use a skin, select the one you want and click the Apply button. You can also click More Skins to connect to the Media Player Web site where you can download other skins – you'll find several others available on this site. You can also get more skins from the Windows XP Plus! pack.

In case you are wondering about additional visualizations, you can download new ones from `http://windowsmedia.com/mg/visualizations.asp?`.

Configuration Options

Along with all of the basic options found in Media Player, you can also click Tools → Options and configure some of Media Player's features. Generally, the default options work great for most people, but you should get familiar with what is available on the Options properties sheet, because you might need to make some configuration changes from time to time. The different tabs you see here are rather easy to use, and the following list gives you a quick overview of what's available.

- **Player** – This tab contains a number of basic check boxes. By default, your Media Player checks the Media Player Web site for updates to Media Player on a monthly basis. This setting is all you need. By default, Media Player opens and starts the Media Player Guide. You can change that behavior by clearing the check box on this tab (refer to Figure 4-12). Notice the Download codecs automatically check box option, which is selected by default. A codec is a compressor or decompressor mathematical algorithm that is used for audio, video, and image files. The codec allows the file to be compressed and then uncompressed so that it can be read. Media Player must have codecs to be able to play files. If a codec is used to compress a file, the same codec is used to decompress it. If Media Player does not have the correct codec, it will attempt to automatically download it for you. If you clear this check box option, Media Player will not be able to get the codecs it needs – so leave this check box selected.

Figure 4-12: Player tab.

- **Copy Music** – This tab enables you to make setting adjustments for copying CD music.
- **Devices** – This tab lists all devices found on your computer that can be used for media playback, such as your CD-ROM or DVD drive. If you select your drive and click Properties, a simple window appears. This tab allows you to choose whether to use analog or digital playback and copy. Typically, this tab is set to digital; but if you're having problems, you can try the analog setting. The error correction feature, available only with digital playback, allows Windows to attempt to resolve problems found in the digital media. This setting can be used, but you might notice a negative effect on the performance of your system – so I recommend you skip it unless you're having problems with digital media.
- **Performance** – These settings affect how Media Player uses your Internet connection. You do not need to configure anything here, but I will note that, by default, Windows Media Player can detect your connection speed to the Internet. This allows Media Player to determine how best to handle media downloads. Make sure you leave this setting as is, because Media Player will perform better if it can detect your Internet connection speeds.
- **Media Library** – By default, the Media Library gives other applications that access the media library read-only access, and no access to anyone on the Internet. You should leave these settings alone.
- **Plug-ins** – This tab, shown in Figure 4-13, allows you to manage plug-ins by adding or removing them and accessing any available properties sheets.

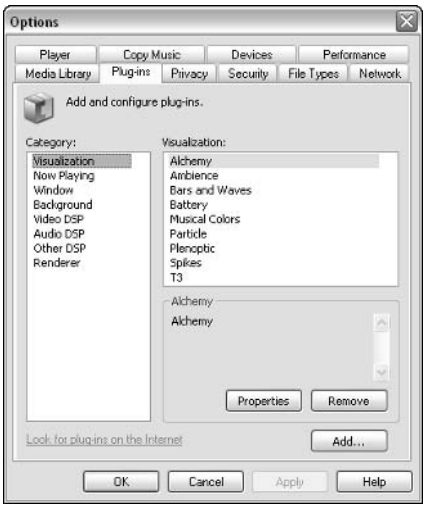

Figure 4-13: Plug-ins tab.

- **Privacy** – The Privacy settings are designed to protect you while you are connected to the Internet. You can peruse this list and make any changes concerning what Media Player can and cannot do, but, in most cases, the default settings are all you need.
- **Security** – The Security settings you have with Media Player simply determine whether or not Media Player can run scripts from the Internet and what Internet Explorer zone Media Player should use. Generally, you do not need to change these settings.
- **File Types** – The File Types tab lists every file type that Media Player can read. You don't need to do anything here unless you want to prevent Media Player from reading a certain file type. In that case, just clear the check box next to the file type's name. This feature can be helpful if you want to use a player other than Windows Media Player, such as RealPlayer, to see certain kinds of content.
- **Network** – This tab contains protocol usage settings and proxy server enabler settings. You don't need to change anything here unless your computer is on a network that uses a proxy server. Unless a network administrator instructs you to make changes, leave this tab alone.

Movie Maker 2

Windows Movie Maker 2 is designed to help you both manage and edit your home videos and pictures. You can use Windows Movie Maker to organize data, edit it, save it, and even share it with others. Windows Movie Maker 2 is a basic video editor. It has some nice features and allows you to combine video, pictures, and audio tracks into one show. It does not provide you with the many features and options you'll find in other video-editing software packages. However, if you need to do basic video editing, it works great and is certainly a great starter package.

One of the greatest benefits of Windows Movie Maker 2 is that you can take analog video (such as your typical camcorder or VHS tape), import the analog video into your computer, and then manage it electronically. Another great feature of Movie Maker is editing. In any given videotaping session, you are likely to have a lot of dull spots. With Windows Movie Maker, you can easily cut away the boring section of video and keep the good stuff. This feature makes watching your movies more interesting and entertaining, as well as shorter. Also, the editing features can help reduce the amount of storage space, and you can even join together unrelated clips of video.

Windows Movie Maker 2 also contains a number of transitions and effects that you can apply to your movies. These effects help dress up the movie and make it more interesting. You'll learn all about these features in this section.

Movie Maker 2 Requirements

Windows Movie Maker is a great tool; but to make it work, you have to spend a little time inspecting the hardware requirements. The trick, of course, is to get your analog or digital video and/or pictures inside your computer and into Windows Movie Maker. First, consider the basic system requirements you need to run Windows Movie Maker:

- **Pentium 600 MHz or equivalent** – If you're using Windows Me on an older processor that is limping along, I'm afraid it won't have the power Movie Maker needs to process graphics and sound.
- **128 MB of RAM** – You need this minimum amount of RAM for Windows Movie Maker to function properly. If you want it to function well, you should have more RAM than 128 MB.
- **Up to 2 GB of storage space** – Movie files use a lot of storage space. Make sure your computer has plenty of room to store the movies you create.
- **A video card or video capture device** – Any standard video card will work fine, or you can use a video card that allows you to capture incoming video data.
- **A sound card or sound capture device** – Movie Maker expects to find both a video and a sound card, or other capture device. If it doesn't, you'll receive an error message telling you that your computer does not meet the requirements.

If you are using a digital camcorder, the connection to the computer shouldn't be any problem. For the best performance, your computer needs an IEEE 1394 card, so you can import movies from a digital camcorder into your computer (especially important if you'll be using any streaming media devices). This type of card provides fast transfer from the camcorder to the computer and is highly recommended by Microsoft. You will need to do a little investigative work to determine whether your computer has this card, if your digital camcorder supports it, and if this transfer card is right for you. Go back to your computer and camcorder documentation for more information. Windows Movie Maker can recognize all kinds of graphics files, from AVI and MPEG to basic Web files such as JPEG and GIF. After the files are loaded and saved onto your hard disk, you can use Windows Movie Maker to import and begin working with them.

If you want to use analog pictures or video, you must use capture devices to move the analog information into your computer, where it is converted to digital information and saved. To do that, you need some kind of capture device that can import the data into your computer. These capture devices are video cards with video and audio input ports and sound cards with an audio input port. By connecting your analog camcorder or VCR to a video card, you can receive the

Windows Media Video File

Windows Movie Maker does present one specific aggravation: When you create movies in Movie Maker, you are forced to save those movies as a Windows Media Video file (WMV). You do not have the option to use other standard video formats, such as AVI or MPEG. Windows Movie Maker can read these types of files, but you can't save your work as one of them. The point here is that you will need a Windows computer that has Windows Media Player installed to be able to play Movie Maker files. That might not be a big deal — but if you want to play the video on a system that does not have Windows Media Player, such as a Macintosh, you will have some compatibility problems.

analog data from the camcorder or VCR and convert it to a digital format for use on your computer. In the same manner, your sound card can convert music and voice data from an analog device into a digital format that can be used on your computer. You may already have a video card and sound card that support this process. If not, you can purchase new cards at your local computer store. They're not terribly expensive, generally anywhere from $100 to $200, but do make sure they are compatible with Windows XP — check the Windows XP Web site (`www.microsoft.com/windowsxp`) for continually updated information about compatible hardware. Also, if you previously owned one of these cards under Windows 98/Me/2000, you might need to download new drivers from the card's manufacturer for it to work correctly with Windows XP. Check out the manufacturer's Web site to see if there is an update.

After you have the card, you can use Windows XP's Movie Maker 2 to capture the data. However, if you have problems, consider using the card's software program to capture the data and save it as an MPEG or AVI file, and then you can import the data into Windows Movie Maker. Also, note that some capture devices save video files in their own default format, which may include compression not supported by Windows XP. When you start to save video using the card's program, make sure you are saving it in a format that Windows Movie Maker supports.

Opening Windows Movie Maker 2

Before you get started using Movie Maker, you'll need to take a few moments to familiarize yourself with the Movie Maker interface. In original versions of Windows XP, Movie Maker 1 was included, so you may need to visit `www.microsoft.com/windowsxp` and download the latest version of Movie Maker before you get started. You can open Movie Maker by clicking Start → All Programs → Windows Movie Maker. The basic interface, shown in Figure 4-14, appears.

Figure 4-14: Windows Movie Maker.

The Windows Movie Maker interface has four major parts:

- **Toolbars** – At the top of the interface, you see the Windows Movie Maker toolbars. You first see the menu options, such as File, Edit, View, Clip, and so on. The menu options contain typical Windows menu features plus those specific to Windows Movie Maker. You also see the standard toolbar under the menu options that presents typical toolbar options. Finally, you see a third toolbar called the Collections/Locations toolbar, which is used to manage the video collections you are working on at the moment. *Collections* are simply file folders used to hold portions of video or pictures – a simple way to organize your files.
- **Tasks area** – The middle-left side of the interface is called the Tasks area. This area is used to view and manage collections of data and view clips that you are working on at the moment. *Clips* are pieces of video or pictures, and you'll learn about those in a moment. Clips appear in the middle portion of the interface.
- **Monitor** – The middle-right side of the interface is called the Monitor. When you are working with video or still shots, the picture appears here. You also have standard Start and Stop buttons (along with others) to view video.

- **Workspace** – The bottom portion of the interface is called the Workspace. You use this area to edit video and/or combine still shots. You'll learn how to use the Workspace later in this chapter.

Recording and Importing Video

Now that you have taken a look at the interface setup, you are ready to begin recording or importing video. You record video if you are streaming it live into your computer. For example, with your digital camcorder, analog camcorder, or other device (such as a DVD player or VCR), you can begin the streaming process, which appears in the Monitor in Windows Movie Maker. To record the video as it appears, just follow these steps:

1. Begin playing the video from the desired device into your computer.
2. Click Start → All Programs → Windows Movie Maker to open the interface.
3. The video appears on the Monitor. Click File → Capture Video. A window appears where you can change the default recording options. Make sure the Create Clips check box is selected, and then click the Record button.
4. Windows Movie Maker records the video. Notice that clips are being created and appear in the Collections area.
5. When you have finished recording, click File → Stop Capture.
6. Press the Save button on the toolbar, or click the File menu and then click Save Project As.
7. The Save As window appears. By default, the project is saved in the My Videos folder found in My Documents. You can select an alternative location if you want. The file is saved as a Windows Movie file (.mswmm).

In addition to recording video, you can also import multimedia files – both video and audio (as well as still pictures). In many cases, you will choose to use the Import feature simply because you can work with previously saved files. To import a file that has previously been saved, just follow these steps:

1. In Windows Movie Maker, click File → Import into Collections.
2. The Import File window opens, as shown in Figure 4-15. By default, the import feature looks in My Videos for a file to import, so you may have to navigate to another location on your computer where the file is stored. Windows Movie Maker looks for all kinds of media files – just select the one you want and click Import. Notice that there is a Create clips for video files check box. You should leave this check box enabled.

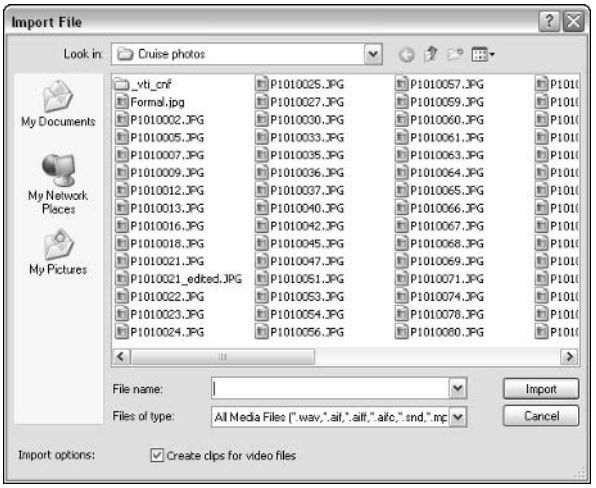

Figure 4-15: You can browse for and import media files.

Working with Collections and Clips

Collections are basically folders that contain clips of video or audio data. Whenever you record or import media, Windows Movie Maker creates clips, by default. Windows XP creates clips to break apart video sequences into manageable chunks. Windows XP examines the video stream and attempts to segment it when the picture sequence changes. This doesn't always work perfectly, but it does work well enough so that Windows Movie Maker can help you manage and edit your video more easily.

If you right-click any collection, you can delete the collection (which deletes all of the clips belonging to that collection), rename it, or import or record more clips into the collection. Note that you can create collections within collections. Remember, collections are just folder structures that enable you to organize clips, so do what works best for you to keep your data organized in a suitable manner.

Assembling Movies

Using Windows Movie Maker, you record or import the clips you want to use, organize them into collections, edit them as desired, and then save the project. You are now ready to begin editing your video or still-shot clips. Keep in mind that you can combine video and still shots into one collection and blend them together as desired. You can also import background music and narrate a movie by recording your voice. The following sections show you how to perform all of these tasks.

SPLITTING CLIPS

Windows Movie Maker creates clips for you; however, you may need to split those clips into more manageable pieces. You can perform this function by using the split command. The following easy steps show you how:

1. Select the clip that you want to split in the Collections area.
2. In the Monitor area, click the Play button.
3. When the clip reaches the point at which you want to split it, click the Split Clip button in the Monitor area. You can also click the Clip menu and click Split, or simply press Ctrl+Shift+S on your keyboard. In the Collections area, the clip is split in two – the first part of the clip retains its original name, while the second clip contains the original name followed by (1), as shown in Figure 4-16. You can change the name, as desired.

Figure 4-16: Split clips appear in the Collections area.

COMBINING CLIPS

Just as you can split a clip into two or more clips, you can also combine clips, as needed. If you want to combine two or more clips, just follow these steps:

1. In the Collections area, select the clips that you want. Select the first clip, hold down the Shift key on your keyboard, and select the remaining clips that you want to combine.
2. Click the Clip menu, and then click Combine. The clips are combined using the first clip's name.

TRIMMING CLIPS

Dead spots often occur in a video where not much is happening. Using Windows Movie Maker, you can simply trim clips so that you remove boring places in the video. This will make your movie more exciting with just a little trimming work on your part. The trim feature is very powerful because it gives you a fine level of control over your clips. You can use the timeline feature in the Workspace and trim away seconds of a clip that you do not want to use. To trim a clip, just follow these steps:

1. In the Workspace, select the clip you want to trim. The first frame of the clip appears in the Monitor.
2. The trimming process *keeps* the portion of videotape that you trim and discards the rest. That seems a little confusing, but think of a piece of paper. You trim away the pieces you don't want but keep the primary piece. With the trim feature, you set a beginning and an end trim point, and everything outside of the area is trimmed away. To begin trimming, click Play in the Monitor area.
3. Watch the clip until it reaches the place where you want to begin trimming. Click the Clip menu, and then click Set Start Trim Point. (Remember, anything previous to the beginning trim point will be discarded.)
4. When the clip reaches the point where you want to stop trimming, click Clip, and then click Set End Trim Point. All video outside of the trim area is cut away.
5. If you don't want to keep the trim points, just click the Clip menu and click Clear Trim Points.

USING THE WORKSPACE

The Workspace at the bottom of the interface is the area where you assemble movies and add transitions or effects. If you examine the interface, shown in Figure 4-17, you see a few buttons on the top left of the area that correspond to areas in the Workspace. You can access volume controls, narration options, zoom controls, and play and rewind buttons, and you see a button that allows you to toggle between the timeline view and the storyboard view.

Figure 4-17: Storyboard view.

You can use the Workspace to create a storyboard or to sequence your clips together. First, drag clips onto the Workspace area to create the storyboard. Begin by dragging the first clip in your movie to the video area of the Workspace. Once in position, you see the first frame of the video displayed in the box. If you change to the timeline view, you can see how much time is consumed, as shown in Figure 4-18. By using the timeline, you can connect pieces of clips together while keeping a watch over the time frame of the entire movie. However, you will probably find that the storyboard view is initially easier to use when you are assembling your movie.

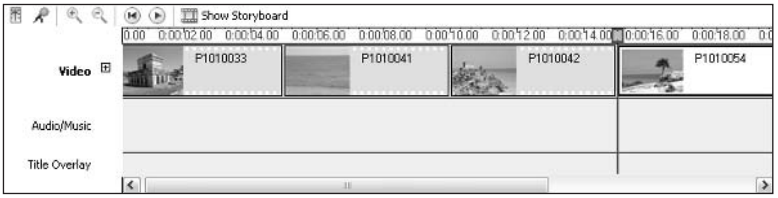

Figure 4-18: Timeline view.

Note the zoom control buttons in the timeline view. While zoomed out, the storyboard is shown to you in increments of 10 seconds. You can zoom in and zoom out to see the clips in whatever time measure you want.

Using Transitions and Effects

Transitions are graphical effects that are used to move from one movie clip to the next. Windows Movie Maker provides several transitions that you can use and you can get more transitions by installing the Windows Plus! pack. You can easily create transitions by using the Workspace. Follow these steps:

1. In the Workspace, make certain that the storyboard view is enabled.
2. Click Tools → Video Transitions. The available transitions appear in the middle portion of the top pane.
3. Drag the desired transition to the transition box on the storyboard. The transition boxes appear between each clip.
4. After you drag the transitions to the storyboard, you see an icon for each of them between each clip, as shown in Figure 4-19. Press Play in the Monitor to see your movie play with the transitions.

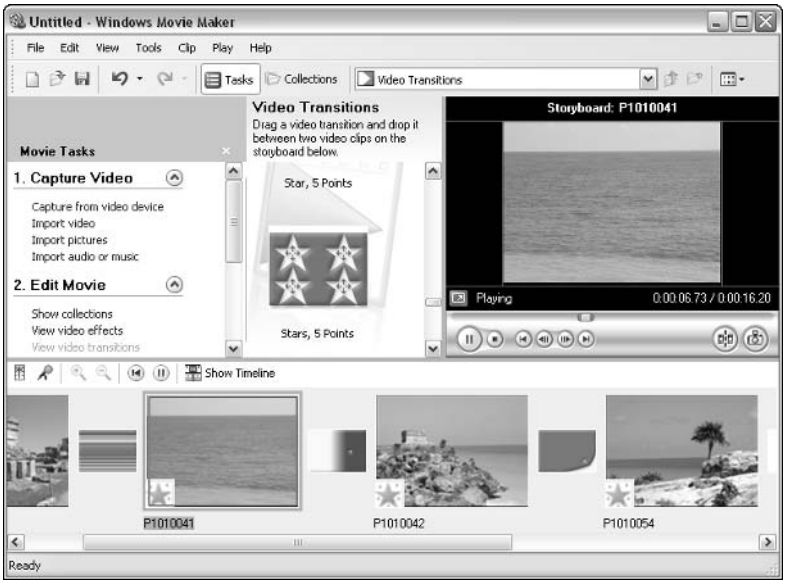

Figure 4-19: Transition options.

Movie Maker 2 also includes a number of effects you can add to any clip or photo. As with transitions, you can use the default effects, or you can get more installed on Movie Maker by purchasing the Windows Plus! pack. Effects cover all kinds of video and/or photo effects, such as blurring features, lighting features, and even an old-age film effect. These features are not necessary, of course, but they can add some cool features to your movies. To add an effect, just follow these steps:

1. Click Tools → Video Effects. The Video Effects appear on the middle portion of the top pane.
2. Scroll through the effects and locate one that you want to use.
3. Drag the effect to the star icon on the desired clip. Repeat this process for other clips to which you want to add effects.
4. Press Play in the Monitor to see your effect in action.

Using Audio in Your Movies

One of the great things about Movie Maker is you can place audio tracks on your movie, such as in a music video fashion, or you can even leave the existing sound track and add background music or narration. After you have placed clips on the storyboard, trimmed and transitioned as desired, you can add audio to your movie.

In the Workspace area, there is an audio portion of the storyboard at the top left

side where you can add and manage audio levels and add narration. To record your voice, or some background music or sounds, click the microphone icon. You should have your computer microphone connected and tested, or make sure that the other sound input device that you want to record is ready. Note that if you want to use an existing audio file, such as music or narration that has already been made, just use the Import feature and drag the audio file to the storyboard.

To record an audio file, just follow these steps:

1. In the Workspace area, click the microphone icon in the timeline view.
2. A window appears listing the sound device that you will use to record the audio, as shown in Figure 4-20. If you have more than one sound device installed on your computer, use the drop-down menu to select a different device, as desired. When you are ready, click the Start Narration button.
3. Give the file a name and save it. The file now appears in your timeline.

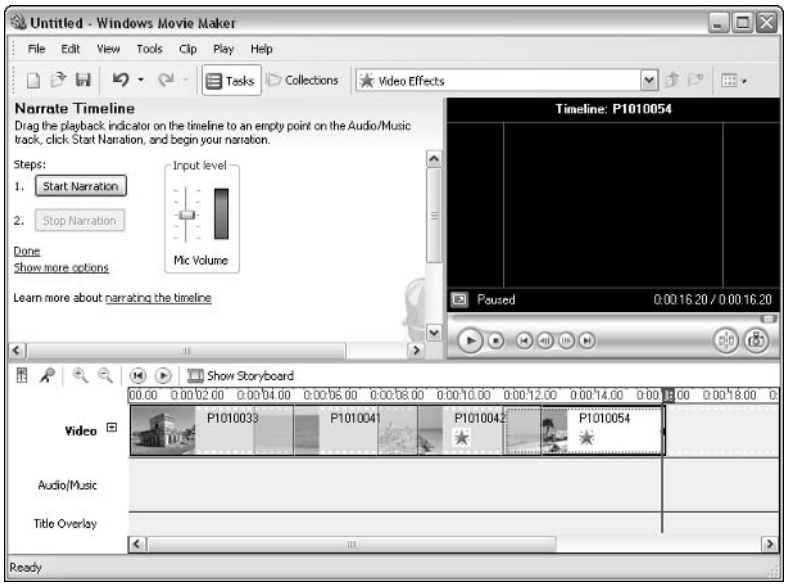

Figure 4-20: Narration option.

After you add audio to your movie, you can adjust the audio level, as needed. This is particularly helpful if you have two streams of audio — for example, a primary audio stream, such as voice, and a secondary audio stream, such as background music. By default, Movie Maker sets both streams to the same audio level, so you'll need to adjust them for your movie. To adjust audio levels, just follow these steps:

1. In Windows Movie Maker, press the Audio Levels button in the timeline view on the Workspace.
2. On the indicator bar that appears, move the slider as needed. The video track contains your primary audio, and the audio track contains the secondary audio.

When you are finished with your movie, be sure to watch it carefully and correct any problems. When you're done, click File → Save Movie. A wizard appears that helps you through the saving process so that you can save the movie in a way that is useful (file system, for e-mail, burned to a CD, and so forth).

Manage Digital Photos

Windows XP provides several helpful features so that you can more easily manage digital photos on your computer. Make no mistake, Windows XP does not provide image-editing software — you'll need to install third-party software to have full image-editing capabilities — but it does provide a number of quick and helpful features for managing digital photos. With the popularity of the digital camera, I expect that you will see even more digital photo tools and features in upcoming versions of Windows.

Most digital cameras today easily connect to Windows XP via Plug and Play. You may have software provided with your camera that can help in the connection process, but for the most part, all you need to do is connect your camera or card reader to a USB port and Windows XP will automatically detect it. You can also use the camera installation wizard found in the Cameras and Scanners folder in the Control Panel, but when in doubt, it is a good idea to check out your camera manual for troubleshooting connection problems. After you have your digital photos on Windows XP, you are ready to use the digital photo features that Windows XP provides.

Working with Photos and Folders

Windows XP allows you to organize photos in any way that you want, just as you would any other collection of files. By default, your photos may be downloaded to the My Pictures folder. However, remember that the My Pictures folder doesn't have any special capabilities — it is simply a folder like any folder on Windows XP. Therefore, you might want to organize your photos in a folder structure by date, occasion, or some other system that has meaning to you. There is no right or wrong approach; the idea is for you to be able to find the photos you want quickly and easily, so develop your own folder system, as necessary.

Windows XP can detect which folders have photos stored in them, and, as such, the folder can give you a Picture Tasks box where you can access common features available on Windows XP. As you can see in Figure 4-21, a folder containing photos has a Picture Tasks box that gives you several options, as a well as a typical File and Folder Tasks box that can also be helpful. Use the View menu to choose a View option that works well for you. In Figure 4-21, I am using the Thumbnails view. This allows me to see the actual photo along with the filename.

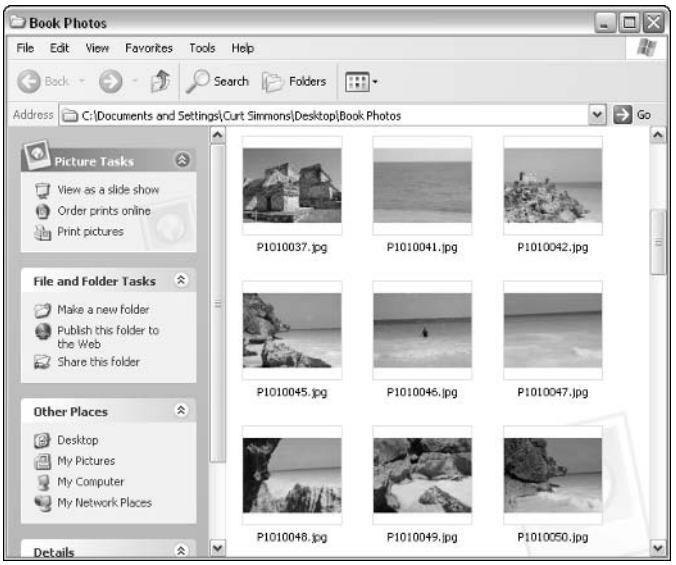

Figure 4-21: Thumbnails view.

You have the following View options:

- **Filmstrip** – This option presents your photos in a filmstrip fashion. You can select a photo and see a bigger image of it and use the controls to simply click through all of your photos. You also have controls that allow you to directly rotate an image. The Filmstrip view, shown in Figure 4-22, is really helpful if you want to get a good look at your photos.
- **Thumbnails** – The Thumbnails view gives you small photo views (shown previously in Figure 4-21). This is a good way to see photos and filenames at the same time.
- **Tiles** – The Tiles option gives you icons (not photos), the filename, image size, and kind of image file (JPEG, TIFF, and so on).
- **Icons** – This option gives you smaller icons with only the filename.

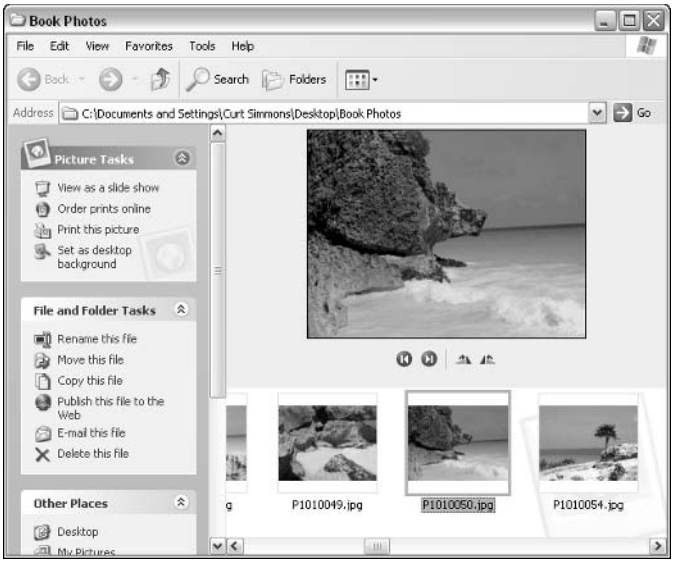

Figure 4-22: Filmstrip view.

- **List** – This option gives you even smaller icons and the filename. This view is useful to see a listing of photos so you can find the one you want by name.
- **Details** – This option is the same as List, but it gives you more information about each photo, such as size, type, date modified, and so on.

You also have quick access to some features by simply right-clicking a photo. When you right-click a photo, you see the basic contextual menu that appears when you right-click just about anything, but you also see some specific options that are useful in managing photos. They are as follows:

- **Preview** – This Preview option opens the photo in Windows Picture and Fax Viewer, as shown in Figure 4-23. Windows Picture and Fax Viewer is not an image-editing program, but as you can see by the buttons at the bottom of the viewer, you can perform the following tasks:
  - Look through photo collections
  - View different sizes
  - See a slide show
  - Zoom in or out
  - Rotate an image
  - Delete an image

- Print an image
- Save an image
- Open an image in whatever default image editor you have installed on your computer

Figure 4-23: Preview option.

- **Edit** – This option opens the photo in the default image-editing program installed on your computer. This might be any of the following:
  - Microsoft Paint
  - Photoshop
  - Photoshop Elements
  - Paint Shop Pro
  - Another program you currently have installed
- **Print** – This action opens a photo-printing wizard, which is explored later in this section.
- **Rotate** – Use the rotate options to quickly rotate your photo.
- **Set as Desktop Background** – This option immediately sets the photo as your desktop background, which keeps you from having to wade through Display properties to make the change. You can also set a photo as the desktop background by selecting it in a folder and clicking the Set as Desktop Background option found in the Picture Tasks box.

Viewing a Slideshow

If you have a collection of photos stored in a folder, Windows XP has a built-in slideshow feature so you can view the photos in the folder as a slideshow. In the folder, just click the View as a Slideshow option that appears in the Picture Tasks box. Your photos will come to life as a full-screen, automatically advancing slideshow. However, if you move your mouse, you'll see control options to manually advance or back up during the slideshow. You can also stop the slideshow with the manual controls, or just press the Esc key on your keyboard. Figure 4-24 shows an example of a slideshow. Notice that this slideshow function is for screen viewing only – you can't create a running slideshow here that you can burn to a CD, but this feature does work great for on-screen viewing.

Figure 4-24: Preview option.

Ordering Prints Online

Windows XP helps you print your photos on your home or office printer, and it can help you order prints online as well. Basically, the process is simply a wizard that helps you select an online photo printing company. The company prints your photos for you and mails them to you within a few days. The prices are reasonable, and this is a great alternative to printing them locally on your printer. Keep in mind

that you do not have to use the wizard to order prints; you are free to simply access any Web site that provides prints and follow the site's instructions, but you might find the wizard helpful, especially if this is the first time you are ordering prints.

If you are wondering about which sites you should order prints from, keep in mind that there are many to choose from (just search for "photo printers" on any search engine, such as www.msn.com), but I recommend the following reputable printers. This list is not exclusive, but I have personally dealt with the following, and they provide quality results and service.

- www.snapfish.com
- www.ofoto.com
- www.photoworks.com
- www.clubphoto.com

If you want to order prints online using Windows XP's wizard help, just follow these steps:

1. If you have a dial-up connection, connect to the Internet.
2. Open the desired folder where your photos reside. In the Picture Tasks dialog box, click Order Prints Online.
3. The Online Print Ordering Wizard appears. Click Next on the Welcome screen.
4. In the Change Your Picture Selection window, shown in Figure 4-25, choose the photos you want to order. Clear the check box of any photo that you do not want to order. Click Next when you are done.
5. The wizard connects to the Internet and downloads information. This can take a few moments, depending on the speed of your connection.
6. In the selection window that appears, shown in Figure 4-26, select the photo company you want to order from and click Next. Note that you may not directly have access to the company you want to order from using this wizard. In this case, exit the wizard and access the desired company's Web site to order without the wizard.
7. The wizard downloads ordering information from the company you selected and displays it, as shown in Figure 4-27. Use the ordering window to select the quantity of each print you want, the size, and so forth. Scroll to the bottom of the window to see your subtotal when you are done and click Next.

8. Depending on the company you selected, you then move through a series of windows where you establish an account and release your credit card and shipping information. Follow the remainder of the wizard screens to place your order.

Online Print Ordering Wizard
Change Your Picture Selection
You can order prints of the pictures that have check marks. To remove a picture from your order list, clear the check box.
48 pictures selected of 52
Select All
Clear All
< Back
Next >
Cancel

Figure 4-25: Clear the check boxes next to the prints you don't want to order.

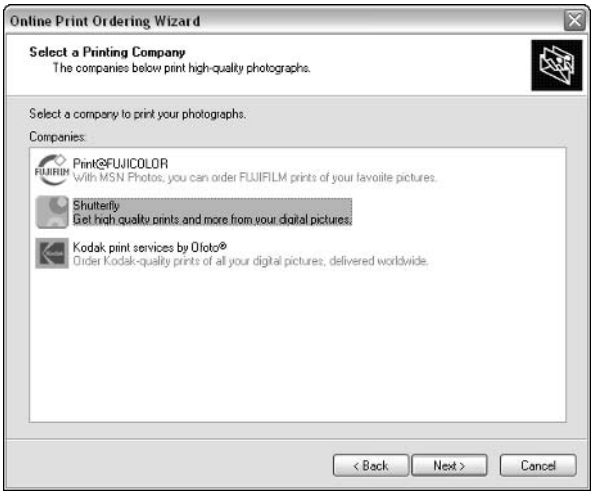
Online Print Ordering Wizard
Select a Printing Company
The companies below print high-quality photographs.
Select a company to print your photographs.
Companies:
Print@FUJICOLOR
With MSN Photos, you can order FUJIFILM prints of your favorite pictures.
Shutterfly
Get high quality prints and more from your digital pictures.
Kodak print services by Ofoto®
Order Kodak-quality prints of all your digital pictures, delivered worldwide.
< Back
Next >
Cancel

Figure 4-26: Select a company.

Figure 4-27: Select print sizes and review your order.

Printing Photos on Your Printer

Printing quality photos on a home or office printer is one of the more frustrating items with digital photos. A common complaint users voice is that photos do not print well or they can't print the desired size. First of all, you can't print quality photos on standard typing paper that you use to print text. The paper is not designed to hold the ink and individual dots of ink run together, giving you a smeared and dull-looking photo. If you want to print effective photos, you must use photo paper. Photo paper, which is sold in packs at any office supply store, is designed to hold the ink and give you the results you want. Photo paper isn't cheap, of course, but you'll need it to print photos.

The next issue is resolution. Resolution refers to the number of pixels in a digital photo. Digital photos are made of tiny dots of color that create images. The number of pixels you have in a photo determines the quality of the photo when it is printed. If there are not enough pixels, the pixels get stretched to make the photo size you want. For this reason, if you have a low-resolution photo, you can't print a quality 5×7 or 8×10 because there is not enough resolution. It is beyond the scope of this book to fully explore resolution and your camera settings, so I suggest that you study your camera's manual or a general digital photography book so that you understand resolution more fully. The important thing to remember is that you need to shoot at a high resolution if you want to print larger photos, such as 8×10s.

Once you have quality paper and the right resolution, you can easily print photos at the size you want using Windows XP's Photo Printing Wizard. The following steps show you how to use the wizard.

1. In the folder containing the photos you want to print, click the Print pictures option in the Picture Tasks box. You can also right-click any photo and click Print, or select multiple photos by Ctrl-clicking them, then right-clicking them and clicking Print.
2. The Photo Printing Wizard appears. Click Next.
3. In the Picture selection window, select the photos you want to print. Clear the check boxes next to any photos that you do not want to print.
4. In the Printing Options window, use the drop-down menu, if necessary, to select the printer to which you want to print, as shown in Figure 4-28. Then, click the Printing Preferences button.

Photo Printing Wizard
Printing Options
Select the printer and paper you want to use.
What printer do you want to use?
Auto HP PSC 750 on WRITER
Install Printer...
Your prints will look best if you select the correct paper before printing. To select paper, click Printing Preferences.
Printing Preferences
Currently selected paper: HP Premium Plus Photo Paper
< Back
Next >
Cancel

Figure 4-28: Choose the printer and printing options.

5. In the Preferences dialog box that appears, make your selections. Make sure you choose a photo paper option from the Media drop-down menu. When you are done, click OK. This returns you to the Printing Options window. Click Next.
6. In the Layout Selection window that appears, choose what you want to print. You have options from full page, contact sheets, and a variety of sizes. As you can see in Figure 4-29, I am printing two 4×6 photos on a single page. Each photo is printed only once. Make your selections and click Next.
7. The photos are sent to the printer and printed. Click Finish.

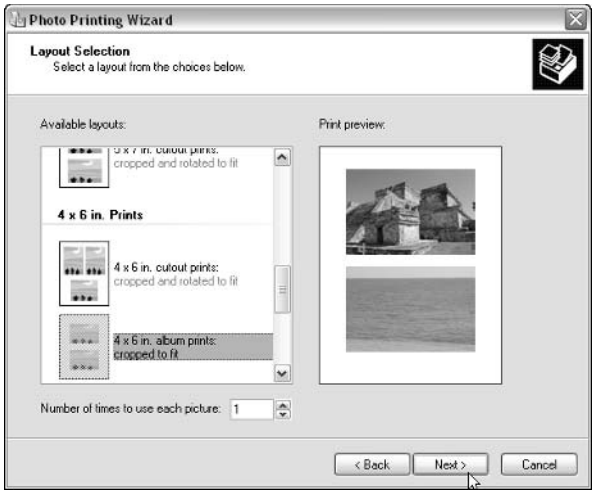
Photo Printing Wizard
Layout Selection
Select a layout from the choices below.
Available layouts:
Print preview:
cropped and rotated to fit
4 x 6 in. Prints
4 x 6 in. cutout prints:
cropped and rotated to fit
4 x 6 in. album prints:
cropped to fit
Number of times to use each picture: 1
< Back
Next >
Cancel

Figure 4-29: Choose a layout option.

E-mailing Photos

One of the great uses of digital photos is e-mail. You can easily e-mail digital photos to anyone so you can share your photos, but the problem has always been file type and resolution. If you send a 3-megapixel TIFF file to someone with a dial-up modem, the download could take an hour or more. In the past, you had to use a photo-editing program to reduce the size of the photo and save the photo as a lower-quality JPEG, but Windows XP gives you a quick and handy tool to reduce the size. Just right-click on a photo you want to e-mail to someone and click Send To → Mail Recipient. A dialog box appears, as shown in Figure 4-30, that allows you to make the photo smaller for e-mail purposes. Just make a selection and click OK; then the copy of the smaller photo is placed in an e-mail message using your default e-mail program.

Send Pictures via E-Mail
Windows can resize the pictures you send in e-mail so that they transfer faster and are easier to view by the recipient. What do you want to do?
Make all my pictures smaller
Keep the original sizes
Make my pictures this size:
Small (fits in a 640 by 480 window)
Medium (fits in a 800 by 600 window)
Large (fits in a 1024 by 768 window)
Show fewer options
OK
Cancel

Figure 4-30: Choose a size option.

Burn Your Photos to a CD

As with any file, you can burn photos to a CD to store them. You can use your CD-burning software as you would with any file, or you can click the Burn to CD link found in the Picture Tasks dialog box in the folder with your photos (this option doesn't appear if you don't have a CD burner). Overall, burning photos to a CD works the same as burning any other file—Windows XP just tries to simplify the process by giving you a direct link in the Picture Tasks dialog box. If you have a CD burner, you can also just right-click any file and click Send To, then choose your CD drive from the contextual menu that appears.

Chapter 5

Startup, Shutdown, and Power Management

IN THIS CHAPTER

- Managing startup
- Managing shutdown, log off, and Fast User Switching
- Using power options

YOU KNOW THE DRILL; YOU start a computer and sit there in an idle state, waiting for the computer to finish booting. Or, you configure power options on a PC, only to find that they tend to lock up the computer and force you to reboot anyway. In the past, one of the most aggravating things about using Windows operating systems was boot time and power management.

Windows has come a long way, as has computer hardware. In Windows XP, you should experience a more moderate boot time, depending on the hardware devices installed on your computer, and the power management features provided for you should work consistently. This chapter explores the issues of starting up Windows XP, shutting down, logging off, Fast User Switching, and power management. Using the information you gain from this chapter, you can ensure that Windows XP starts up and shuts down smoothly and that power management works in a manner that is effective for you.

Startup

Windows XP is designed to boot in a reasonably quick manner. However, this feature depends on your system configuration and your hardware. If you have a bunch of programs that are configured to start automatically at bootup, or if you have a number of devices that must be started, Windows XP may take longer to boot. Overall, however, you shouldn't have to wait an unreasonably long period for Windows XP to start.

If you are not happy with the way Windows XP is starting, there are two main actions you can take that might help reduce boot time. First of all, Windows XP is designed to learn from previous boots. Windows XP can identify code and startup options and reorganize startup a bit to speed it up. In other words, booting should become a bit faster as Windows XP learns from previous boots. If you want to help Windows XP boot faster, you can check your device drivers and also remove any items from the startup list that you don't necessarily need at startup.

Device drivers can slow down a system boot. If you are using drivers with hardware devices that were not written for Windows XP, those drivers can cause problems or simply take more time to load. So use drivers written for Windows XP. If you are using older hardware, check the manufacturer's Web site for updated drivers. Also, try to use a driver that is as close to Windows XP as possible. In other words, use a Windows 2000 driver over a Windows Me driver if one is available.

The second tactic you can take to speed up boot time and manage startup items is to use the MSCONFIG utility. MSCONFIG, or the System Configuration Utility, is an older utility still found in Windows XP. To access the System Configuration Utility, click Start→Run, then type **MSCONFIG** and click OK. The System Configuration Utility dialog box appears, as shown in Figure 5-1.

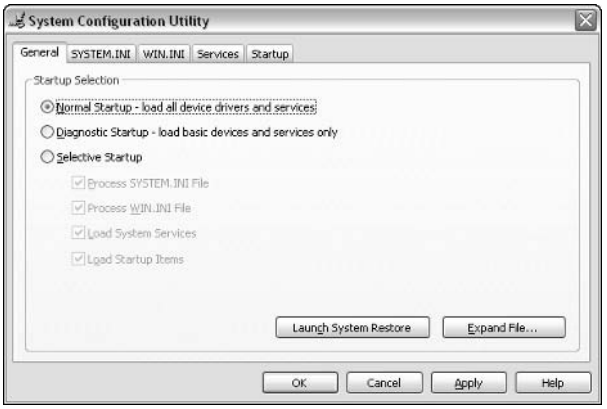

Figure 5-1: System Configuration Utility.

There are three major tabs you can work with here concerning startup:

- The General tab is used to make a startup selection, as shown in Figure 5-1. In most cases, you'll leave the Normal Startup option selected. With the normal startup, all device drivers and services are loaded during startup. You also have the option to use a Diagnostic Startup, where only basic devices and services are loaded. This feature is helpful if you're having problems with startup because it can help you identify the problem by

only loading basic devices and services. Finally, you have a Selective Startup option, where you can choose not to process selected startup items, such as system services. You don't need to use the Diagnostic or Selective Startup options unless you are having problems with Windows XP starting normally. Note that you can also launch System Restore from this tab so that Windows XP can attempt to fix the startup problem automatically.

See Chapter 19 to learn more about Windows XP's System Restore.

- The Services tab, shown in Figure 5-2, shows you all of the services that start on your computer when it is booted. Naturally, the more services that have to start, the more time that is required to actually boot Windows. It is a good idea to look through this list and see what is starting. You may have a number of application services that start on bootup that you really do not use. In this case, you can simply clear the check box next to the service to stop it from starting automatically at bootup. Naturally, you should exercise care when disabling services because a number of these services are required for different Windows XP components to work properly, such as networking, indexing, and so forth. However, look for services that you can live without that have been added, especially by other manufacturers. Reducing the number of services that must start will reduce the overall boot time.

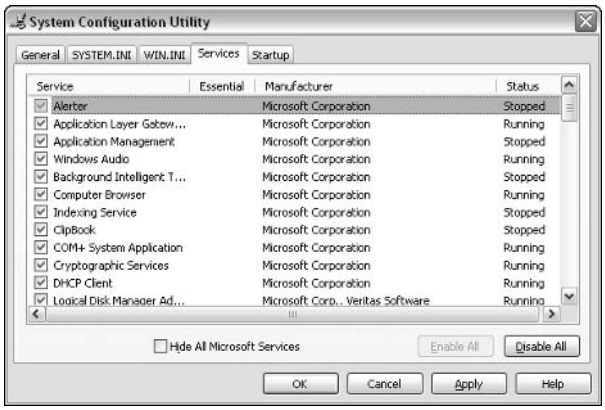

Figure 5-2: Use the Services tab to disable services at startup.

- Finally, if you take a look at the Startup tab, shown in Figure 5-3, you see any applications that are configured to start when the computer is booted. Again, you do not want to disable applications that are configured to start by the system because this action can cause different Windows XP features to stop working, but you may have other applications that are configured to boot that you do not need. For example, in Figure 5-3, you can see that I have a screen capture utility called SnagIt configured to start when the computer boots. If I decide that I no longer want this program to start automatically, I can simply clear the check box here to stop the program from automatically starting. As with services, the fewer applications that must automatically start, the quicker your system will boot.

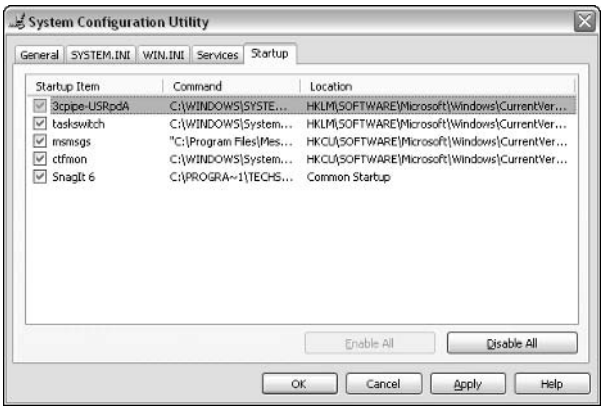

Figure 5-3: Use the Startup tab to disable applications at startup.

If you are serious about startup control, you may consider using a free third-party utility that will give you more options. Several are available, but I suggest you check out Startup Cop, which you can download from `www.pcmag.com/utilities`.

Shutdown, Logoff, and Fast User Switching

Windows XP gives you a few different options for managing shutdown or logoff, as well as a feature called Fast User Switching. These options can easily help you manage Windows XP from a shutdown or logoff point of view, and they are all easy to use. The following sections explore your options.

Shutdown Options

When you click Start → Turn Off Computer, you have three options that appear in the Turn off Computer dialog box, shown in Figure 5-4.

Figure 5-4: Shutdown options.

The options are as follows:

- **Hibernate** – The Hibernate option saves all of your current desktop settings to the hard disk, including any applications that are currently open and files that are open, then shuts down the computer. When you restart, your desktop, applications, and files return as though you had never actually shut down the computer. Your computer must be configured to support the Hibernate feature. See the *Power Management* section later in this chapter for more details.
- **Turn Off** – This option shuts down Windows and turns off the computer. If you have any applications currently open, you must save your work before shutting down or the work will be lost.
- **Restart** – This option restarts Windows. You must save anything you are working on before restarting, because all applications are closed during the shutdown. Any unsaved data is lost during a restart.

Log Off Options

When you click Start → Log Off, you see a Log Off Windows dialog box that gives you two options: Switch User and Log Off. The Switch User option works if you have Fast User Switching enabled, which is explored in the next section. The Log Off option closes all programs and brings you back to the Welcome screen so that another user can log on. Keep in mind that when you log off, all of your applications are closed. You must save and exit any current work. When the next user logs on, the settings from his or her user account are then loaded into memory and he or she can begin using applications and files.

One quick note concerning logoff: By default, Windows XP uses the Welcome screen where users can click their usernames and enter a password if one has been configured for them. If you want a bit more security so that users must type their usernames and passwords, you can disable the Welcome screen. In this case, users see only a standard Windows logon dialog box instead of the Welcome screen. To disable the Welcome screen, open Control Panel→User Accounts. In the User Accounts window, click the option to change the way users log on or off. In the Select logon and logoff options window, shown in Figure 5-5, clear the Use the Welcome screen check box and click Apply Options.

You must use the Welcome screen if you want to use Fast User Switching. Fast User Switching will not work, and the option is not available, if the Welcome screen is not enabled.

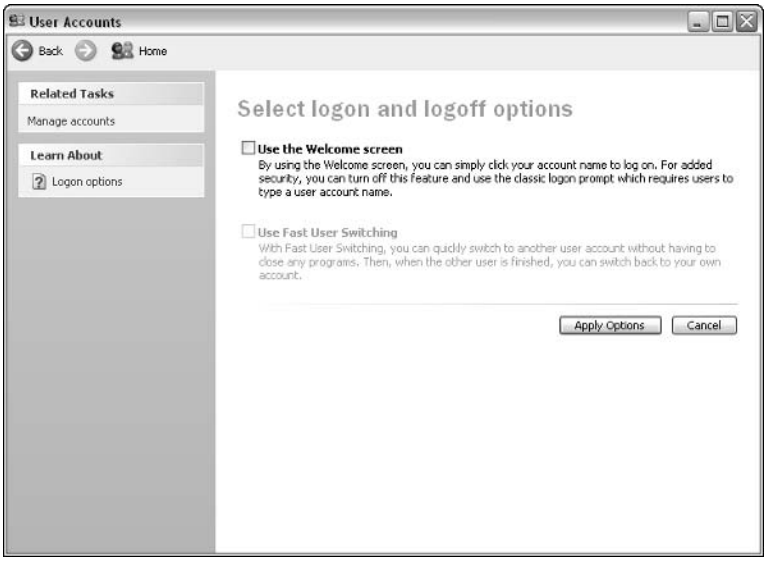
User Accounts
Back
Home
Related Tasks
Manage accounts
Learn About
Logon options
Select logon and logoff options
Use the Welcome screen
By using the Welcome screen, you can simply click your account name to log on. For added security, you can turn off this feature and use the classic logon prompt which requires users to type a user account name.
Use Fast User Switching
With Fast User Switching, you can quickly switch to another user account without having to close any programs. Then, when the other user is finished, you can switch back to your own account.
Apply Options
Cancel

Figure 5-5: You can disable the Welcome screen in User Accounts.

Working with Fast User Switching

Fast User Switching is a helpful feature in environments where more than one person uses the same computer. When you log off a computer, all of your files and applications are closed. When using Fast User Switching, all of your files and programs remaining running. Essentially, you remain logged on to the computer, but another user can switch the desktop to his or her user account. For example, say

Lock Your Computer

If you are not using Fast User Switching, you have a quick and easy option to lock your computer when you are not using it. The lock feature allows all of your programs to continue to run, but only you or an Administrator will be able to access the computer while you are away. If an Administrator unlocks the computer, he or she will have to log you off before using the computer. To lock your computer, press CTRL+ALT+DEL. In Windows Task Manager, click the Shut Down menu and choose Lock Computer. You can also just press the Windows + L key. When you lock the computer, you'll see a Windows dialog box. Just log back on when you are ready to unlock the computer.

you are working on several applications at the same time. Another user who accesses your computer needs to check his or her e-mail. In the past, you would have to save all of your work, log off, and then the other user would log on. After that user logged off, you would log back on and restart all of your applications. With Fast User Switching, you can leave all of your applications open and simply choose to switch users. The other user accesses his or her desktop and checks his or her e-mail, and then you can simply switch back to your account. Your work and applications remain untouched. As you can imagine, the implications of Fast User Switching are far reaching in environments where several different people use the same computer.

The Welcome screen must be enabled in User Accounts for Fast User Switching to work. Refer back to Figure 5-5 and you can see that Fast User Switching is disabled in User Accounts, but it cannot be enabled unless the Welcome screen is also enabled. The computer cannot be joined to a Windows domain. Because of the security features of a domain, Fast User Switching will not work if the computer is joined to a domain. Also, offline files must be disabled for Fast User Switching to work. If offline files are enabled, you can turn off the feature using Folder Options in the Control Panel. Finally, Fast User Switching requires that the computer have at least 64 MB of RAM. Of course, because the basic Windows XP RAM requirement is 128 MB, this typically isn't an issue.

After you enable Fast User Switching in User Accounts, you can easily begin using the feature by clicking Start → Log Off, then choosing the Switch User option. You can also just press the Windows + L keys on your keyboard to switch users, if your keyboard has a Windows key.

You must consider some other issues when using Fast User Switching with Remote Desktop. See Chapter 13 to learn more.

Power Management

Windows XP provides several different configuration options that allow you to manage power on your computer. More simply put, Windows XP can turn off portions of the computer or automatically put itself in a stand-by state when you are not using the PC. You can also use the Hibernate feature if your computer supports it.

Before you get into the configuration of power management options, it is important to understand what makes the power features tick. Windows XP supports the Advanced Configuration and Power Interface (ACPI), which is an industry standard designed to save power on computer operating systems. Developed by a number of companies, such as Microsoft, Intel, Compaq, and several others, ACPI enables a computer to automatically power down system components when they are not in use, and then automatically power up system components as they are needed.

Along with the use of ACPI, Windows XP also supports the older Advanced Power Management (APM). APM is an older power management scheme that was supported under Windows 95 and older computer Basic Input/Output Systems (BIOS). The idea behind APM is the same as ACPI, but it did not work as well. The computer could not make accurate inactivity assessments and, as such, the hardware sometimes shut down at inopportune times, such as during a long file download. Also, APM could not detect when a device connected to the computer needed to be used. For example, say that you had a network printer attached to your computer using APM. Once APM shut the hardware down, the system could not detect that a network user needed the printer—it remained in a sleep state until someone physically moved the mouse or touched the keyboard—and even then it sometimes would not wake up.

ACPI is a much better specification and gives the operating system more control over hardware power-down states and greater ability to power up hardware, as needed. For example, say that you use ACPI on 100 Windows XP computers. The computers power down during the night, but you want to run disk defragmenter once a month during the middle of the night. Under ACPI, this configuration is no problem because the system can power up the hard drive when it is needed. After the utility has run, the system can power down again. This configuration is not possible under APM because manual mouse and keyboard strokes are required to wake the computer.

In an ACPI-compliant system, power management is handled throughout the entire computer system, which includes computer hardware, software, and the operating system itself. ACPI works in Windows XP through operating system management and through the BIOS. For ACPI to work, the computer's BIOS must support ACPI. In today's computer market, this typically is not a problem, because basically all newer computers support ACPI. If the computer does not seem to support ACPI, you can check the computer's Complementary Metal Oxide Settings

(CMOS) and make sure that operating system control is turned on so that Windows XP can control power management throughout the system. Check your computer documentation for details about accessing CMOS setup and how to configure the CMOS settings on your PC.

During Windows XP installation, the operating system detects ACPI compliance and invokes the ACPI standard. In other words, you can't manually control whether or not ACPI is used, but you can manage what ACPI does, and you do that through Power Options properties.

Power Options properties are available as an icon in the Control Panel, or you can also click the Power button on the Screen Saver tab of the Display Properties dialog box. Either way, you end up at the Power Options Properties dialog box, which gives you several different tabs. The following sections show you what you can do on these tabs.

Power Schemes

On the Power Schemes tab, you can configure a power scheme for your computer. As shown in Figure 5-6, the Power Schemes tab provides you with a Power schemes drop-down menu where you can choose a preconfigured power scheme. You have the following preconfigured options:

- **Home/Office Desktop** – This option turns the monitor off after 20 minutes of inactivity, but never turns the hard disk off.
- **Portable/Laptop** – This option turns the monitor off after 15 minutes of inactivity and turns the hard disk off after 30 minutes of inactivity.
- **Presentation** – This option never turns the monitor or hard disk off, because you would not want to use the power options during the middle of a presentation.
- **Always On** – This option provides the same settings as the Home/Office Desktop feature.
- **Minimal Power Management** – This option turns the monitor off after 15 minutes of inactivity but never turns the hard disk off.
- **Max Battery** – This option turns the monitor off after 15 minutes of inactivity but never turns the hard disk off.

As you can see, the different power schemes are designed for different needs, but there is some repetition in them, as well. You can customize any power scheme you want and create your own. To customize a power scheme, just choose one from the drop-down menu, and change the monitor and hard disk settings from the drop-down menu, as desired. For example, if you wanted to increase power saving

options, you could choose the Max Battery setting, but change the monitor and hard disk settings so that power down occurs more quickly. After you have configured the scheme to meet your needs, click the Save As button, give your new scheme a name, and it will be added to your Power schemes drop-down menu.

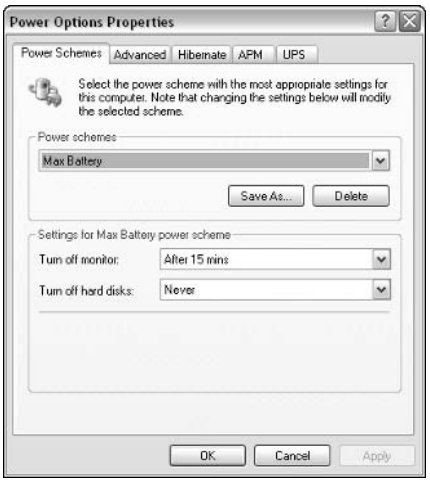

Figure 5-6: Power Schemes.

Advanced

The Advanced tab, shown in Figure 5-7, gives you two simple options you can use:

- Always show icon on the taskbar
- Prompt for password when computer resumes from standby

The Taskbar icon option is entirely a personal decision, but do consider using the second option if your computer is in a place where someone else could access it. This feature can prevent you from having to log off or lock your computer every time you leave it idle.

Hibernate

Hibernation is an ACPI feature that stores all of the information that is in memory on the hard disk, and then shuts down the computer. When you restart the computer, the information is then read from the disk and back into memory. To use hibernation, your computer needs 1 MB of free disk space per 1 MB of RAM. As shown in Figure 5-8, a computer with 256 MB of RAM needs at least 256 MB of free disk space, because the data in RAM is written to the hard disk. To use hibernation, just enable the check box on the Hibernate tab.

Figure 5-7: Advanced tab.

Power Options Properties
Power Schemes
Advanced
Hibernate
APM
UPS
When your computer hibernates, it stores whatever it has in memory on your hard disk and then shuts down. When your computer comes out of hibernation, it returns to its previous state.
Hibernate
Enable hibernation
Disk space for hibernation
Free disk space: 594 MB
Disk space required to hibernate: 256 MB
OK
Cancel
Apply

Figure 5-8: Hibernate tab.

If your computer supports hibernation, you can go back to the Power Schemes tab, shown in Figure 5-9, and see the hibernation setting available. Then use the drop-down menu to select the amount of time that should pass before the computer hibernates.

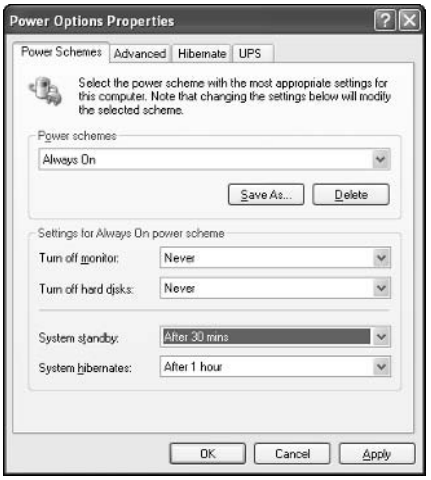

Figure 5–9: Hibernation appears on the Power Schemes tab.

APM

If your computer can support Advanced Power Management (APM), you'll see the option to enable APM support on this tab. Simply check this tab to see if the computer can support APM, and click the check box to enable it.

ACPI and APM can work together, and on laptop computers you should certainly enable APM because it can help you to effectively manage battery power.

UPS

Uninterruptible Power Supply (UPS) is a feature that allows you to attach a UPS device to your computer. In the event of a power failure, the UPS device provides enough battery power for the computer to continue running so that you can perform an orderly shutdown. If you have a UPS device, you'll see the option on the UPS tab, and you can see the status of the UPS device and configure any options the UPS device provides. See the UPS device's documentation for further information.

Chapter 6

Managing Hardware on Windows XP

IN THIS CHAPTER

- Installing and removing hardware
- Working with drivers
- Managing driver signing
- Working with display devices
- Managing removable media drives

INSTALLING AND MANAGING HARDWARE on Windows operating systems has been a real chore for even experienced users in the past. You had to deal with conflicts, know your interrupt request lines (IRQs), and overall just hope that things worked out well. Fortunately, computer hardware has come a long way, and Windows XP is the easiest operating system so far in terms of installing and managing hardware on your PC. With the tools Windows XP gives you, hardware no longer needs to be a major problem. This chapter explores the features and tools Windows XP gives you to manage computer hardware.

Installing and Removing Hardware on Windows XP

Windows XP is a plug-and-play system, meaning that Windows XP can detect hardware changes and adapt to them. For example, you can install a new video card and, upon reboot, Windows XP will detect the new hardware and attempt to automatically install it. If the installation is successful, the hardware is automatically ready for use.

If installation is not successful, a prompt appears for the Add Hardware Wizard, so that you can attempt to manually install the hardware. Under most circumstances, Windows XP can automatically install up-to-date plug-and-play hardware. Windows XP has the most extensive device driver database to date, and

Windows XP can usually locate a basic driver to work with most plug-and-play devices. The trick is to use hardware that is compatible with Windows XP. When purchasing and installing new hardware, check for compatibility, and also check the Hardware Compatibility List (HCL) at `www.microsoft.com/hcl` to see if the device is listed. Note, however, that just because a hardware device is not listed on the HCL does not mean the device will not work with Windows XP — it just means that Microsoft hasn't tested the device.

In the event that you need to manually install a hardware device on Windows XP, you can use the Add Hardware Wizard in the Control Panel, which will help you install the device. Before installing a device manually, you'll probably need the driver for the device. A driver is a piece of software that allows Windows XP and the hardware device to communicate with each other. As I mentioned, Windows XP has a large database of generic drivers that will often work, but the specific driver created for the hardware device (by the hardware vendor) is often your best choice. If Windows XP is having problems installing the device automatically through plug and play, you will probably need the device driver. The driver often accompanies the hardware device on a floppy disk or CD-ROM, or you can usually find it on the device manufacturer's Web site. The following steps show you how to use the Add Hardware Wizard.

1. Click Start → Control Panel → Add Hardware.
2. Click Next on the Welcome screen.
3. The wizard searches for any hardware that has been connected to the computer. If the hardware is not found, a window appears that asks if the hardware is connected. Make the correct selection and click Next.
4. You can use the Add Hardware Wizard to troubleshoot a device that is not working or add a new hardware device. In the provided window, make a selection.
5. The wizard prompts you to either install the hardware by selecting it from a list or have Windows search again. Because Windows has not been able to detect the hardware up to this point, it is usually best to choose the Install the hardware that I manually select from a list radio button. Click Next.
6. A hardware-type window appears that allows you to choose the kind of hardware device you want to install. Choose a desired category and click Next.
7. Windows XP generates a list of hardware from the category that you selected. In the selection window, choose the manufacturer and the model of the hardware that you want to install. If you have an installation disk for the hardware, you can click the Have Disk button and run the hardware installation routine from the disk. Make a selection and click Next.

8. The hardware you want to install is listed. Click Next to continue the installation. Files are copied and the device is installed. Click Finish to complete the installation.

You can also use the Add Hardware Wizard to troubleshoot problematic devices. This option essentially provides you with a look at the device's properties and attempts to help you discover what is causing the problem so that it can be fixed. The following steps show you how to use the Add Hardware Wizard to troubleshoot a device:

1. Click Start → Control Panel → Add Hardware.
2. Click Next on the Welcome screen.
3. Windows XP searches for new hardware. If none is found, you'll see the list of devices currently installed on the computer. Devices that are not functioning properly appear with a yellow exclamation point beside them. Select the problematic device and click Next.
4. The final screen appears with a status message for the device. Click Finish and the troubleshooter for the device begins. From this point, you can use the troubleshooter or attempt to solve the problem on your own.

The Add Hardware Wizard's troubleshooting feature is helpful, but you can easily gain the same information using Device Manager, which is explored in the next section.

Using Device Manager

A helpful tool that you can use to explore the configuration of hardware devices and make changes to that configuration is the Device Manager. Device Manager has been around for several iterations of Windows, and it is still an important feature in Windows XP. You can access Device Manager via the Computer Management console, or you can simply click the Device Manager option on the System Properties' Hardware tab.

Either way, the Device Manager interface, shown in Figure 6-1, gives you a listing of hardware categories. If you expand the category, you can see the hardware devices installed under that category. Using Device Manager, you can easily scan hardware categories and the installed hardware. If you right-click a hardware device, you can do any of the following:

- Update the driver
- Disable the device

- Uninstall the device
- Scan for hardware changes
- Access the device's properties

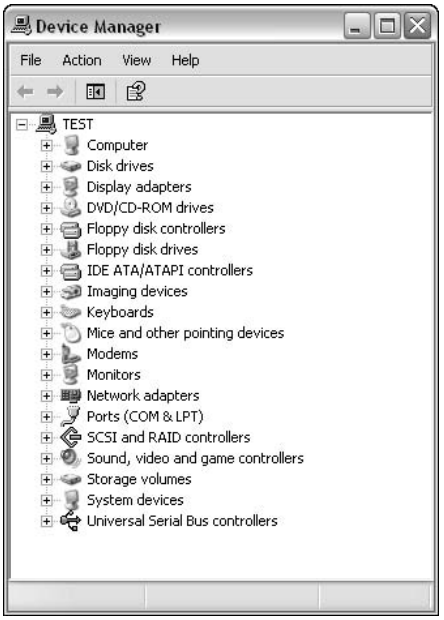

Figure 6-1: Device Manager.

If you right-click the desired device and click Properties, you'll see a few different tabs. As a standard, most devices have the General, Driver, and Resources tabs. Some devices may have additional tabs specific to those devices. For example, Mouse properties usually has an Advanced Settings tab where you can configure how the wheel operates. Because the General, Driver, and Resources tabs are available for most devices, let's consider the available options on each.

On the General tab, shown in Figure 6-2, you have a few basic items. First, you see the following:

- Device name
- Device type
- Device manufacturer
- Physical location of the device on the system

In the Device status window, you can see any error messages or problems that apply to the device. If problems exist, you can start the hardware troubleshooter by clicking the Troubleshoot button. In the Device usage drop-down menu, you have the enable or disable device options. To disable the device, simple choose the disable device option from the drop-down menu.

Figure 6-2: General tab.

The Driver tab provides you with an easy way to manage a device driver. Because driver management is overall a big part of hardware management, the next section devotes more time to the device drivers and the information on this tab.

On the Resources tab, shown in Figure 6-3, you'll see the following:

- Memory ranges
- I/O range
- IRQ setting
- Related hardware resource configuration that has been configured automatically by Windows XP

Note that the settings cannot be changed unless there is a conflict. If a conflict does exist, the conflicting device will be listed in the dialog box, and the option to manually change the setting will not be grayed out. You can then try to adjust the resource settings so that the devices do not conflict with each other.

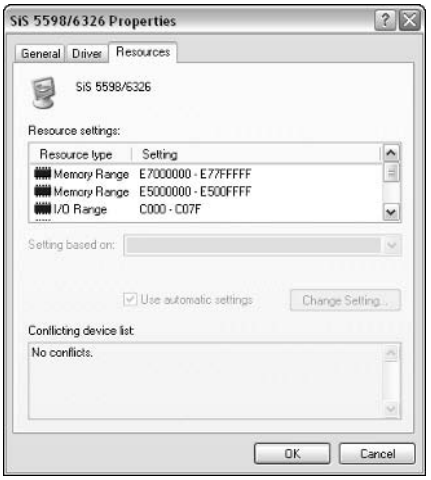

Figure 6-3: Resources tab.

Configuring Hardware Profiles

Hardware profiles are nothing new in Windows XP – they have been around since the days of Windows 9*x*, but they continue to be an important part of Windows XP hardware configuration – especially for laptop computers.

The purpose of hardware profiles is to enable a laptop computer to have different hardware configurations, without having to install and/or uninstall hardware every time the computer is in use. Consider an example. Say that you use a laptop computer in an office setting. While connected to the local area network (LAN) at the physical office, you use a mouse, keyboard, and desktop monitor with the laptop. You also have a local printer. However, when you are on the road, the external keyboard, mouse, monitor, and printer are not used. Using hardware profiles in this situation, you could configure a docked and undocked profile so that Windows XP knows what hardware to use when you are connected to the physical network and when you are traveling.

The end result is that you save system resources when you are on the road by not loading additional unnecessary hardware configuration data, and your applications do not get confused about what device is available. You can easily configure hardware profiles for a computer, as needed, and the following steps show you how:

1. Open Control Panel → System Properties.
2. Click the Hardware tab and click the Hardware Profiles button. You see the Hardware Profiles window appear, as shown in Figure 6-4.

Figure 6-4: Hardware Profiles.

3. You see the current default profile. If you click the Properties button, you can see the basic properties of the default profile, as shown in Figure 6-5. You have two basic options here. You can identify the profile as a profile for a portable computer, and you can choose to always include the profile as an option when Windows starts.

Figure 6-5: Profile Properties.

4. To create a new profile, click the Copy button. A Copy Profile dialog box appears. Enter a desired name for the new profile and click OK. The current configuration from the default profile is copied to the new profile. At this point, you have two profiles that are the same.

5. You can now select the new profile and click Properties. In the provided dialog box, you can choose the portable computer option and to always include the profile option when Windows starts.
6. In the Hardware Profiles window, you now see the two profiles. When you restart the computer, you'll see a boot menu so that you can select the profile that you want. Click OK in the Hardware Profiles window and restart Windows XP.
7. During bootup, a hardware profile menu appears. Select the new hardware profile that you want to use and allow Windows XP to boot using that hardware profile. Log on to the computer.
8. Open System in the Control Panel, click the Hardware tab, and click the Device Manager option.
9. Now that you are in Device Manager, access the properties pages for the devices that you do not want to use under the new profile. On the General tab of those devices, choose the Do not use this device in the current hardware profile (disable) option. Continue this process until you have disabled any devices that should not be part of the portable hardware profile configuration.
10. Close the properties pages for the device. Notice that the devices you have disabled now appear in the Device Manager with a red X over them, noting that the device is disabled.
11. At any time, you can create additional hardware profiles by following these steps, or you can delete any hardware profiles by returning to the Hardware Profiles window.

Working with Device Drivers and Driver Signing

A device driver is software that allows Windows XP to interact with a hardware device. The driver determines communication parameters and, essentially, acts as a bridge between the operating system code and the device driver. The driver, then, allows the operating system to drive the hardware device, which you then control through the operating system interface.

Drivers are developed by hardware vendors, and from Microsoft's point of view, how well a driver operates with Windows XP is solely the hardware vendor's responsibility. When Microsoft releases a new operating system, an updated device driver generally needs to be created so that the device can communicate with the new operating system. This is the primary reason that some devices fail to operate after an upgrade – the driver is incompatible with the new operating system.

Even though device drivers are the responsibility of hardware manufacturers, Windows XP still maintains a generic database of drivers so that hardware can function with Windows XP, even if a manufacturer's driver is not available. Under most circumstances, the manufacturer's driver should be used, if at all possible, because it is specifically developed for the hardware device's interaction with Windows XP. So, the short lesson here is to simply use hardware that is compatible with Windows XP, and make sure you are using the most current driver designed by the manufacturer, if possible.

Because driver configuration and management can be difficult, Windows XP provides you with the Driver tab, found on each device's properties pages, which can be accessed from the Device Manager. The Driver tab, as you can see in Figure 6-6, gives you a few different button options that you can use to manage the device's driver.

Figure 6-6: Driver tab.

If you click the Driver Details button, you see information about the driver, such as the following:

- Location
- Provider
- File version
- Copyright
- Digital signer information

This data can be helpful when you want to gain basic information about the driver. Because drivers are updated periodically, you should strive to always use the most current driver. To help with this process, Windows XP uses the Hardware Update Wizard, which enables you to replace an older driver with a newer one. The steps are self-explanatory, so if you need to update a driver, just click the Update Driver button on the Driver tab.

On the Driver tab, you also see buttons for Roll Back Driver and Uninstall. If you install a new driver for a device and the new driver does not function well, you can use the Roll Back Driver feature to use the old driver. This feature pulls the old driver out of a backup file and reinstalls it. If you want to completely remove a driver, use the Uninstall button. You'll see a warning message that tells you that you are about to remove the device from your system. When you uninstall the driver, the device is uninstalled as well. At this point, Windows XP plug and play will detect the uninstalled hardware device as new hardware and attempt to reinstall it. In some cases, this can help you uninstall and reinstall a problematic device, especially if you are having driver problems.

Aside from the driver management options found on the Driver tab, you can also manage driver signing in Windows XP. Driver signing, first introduced in Windows 2000 systems, enables you to make certain that you are only installing and using drivers that have been signed, or certified by Microsoft. This feature makes certain that the drivers have been tested and will work with specified hardware on Windows XP. This, however, certainly does not mean that unsigned drivers are damaging to your system or will not work – it just means that Microsoft has not approved or tested them, and you are on your own in terms of testing, compatibility, and troubleshooting. Signed drivers have a digital signature stamp that cannot be altered without altering the entire driver package. This feature tells you that a signed driver is, in fact, a signed driver and you can feel safe when using the driver on your system.

Another advantage of signed drivers, especially concerning Internet download, is that a signed driver tells you that the package is actually a verified driver – not a virus or other malicious code acting like a driver. When downloading, the signed driver feature can certainly give you a measure of protection. Use signed drivers whenever possible. With the signed driver, you can ensure that the driver has been tested and has received Microsoft's seal of approval. Of course, in some cases, using a signed driver may not be possible. This is certainly fine, but it leaves you doing your own homework to determine if the driver will work and if the driver is safe to use.

You can manage how driver signing works in Windows XP so that Windows handles driver signatures in a way that works for you and your environment. If you open System Properties and click the Hardware tab, then you see a Driver Signing button. Click the button to open the Driver Signing Options window, shown in Figure 6-7.

Driver Signing Options
During hardware installation, Windows might detect software that has not passed Windows Logo testing to verify its compatibility with Windows. (Tell me why this testing is important.)
What action do you want Windows to take?
Ignore - Install the software anyway and don't ask for my approval
Warn - Prompt me each time to choose an action
Block - Never install unsigned driver software
Administrator option
Make this action the system default
OK
Cancel

Figure 6-7: Driver Signing Options.

You have the following options that you can invoke to determine how Windows XP handles driver signing:

- **Ignore** – If the driver is not digitally signed, this option tells Windows to ignore that the software is not signed and install the software anyway. You will receive no warning messages or prompts when using this setting.
- **Warn** – If the driver is not digitally signed, a warning dialog box appears so you can choose to install the driver or not. This is the default setting.
- **Block** – If the driver is not digitally signed, the operating system will not install it.
- **Administrator option** – This check box option enables you to make the Ignore, Warn, or Block setting that you choose be the default for all users on this particular Windows XP computer. You must be an administrator on the local machine to enable or disable this option.

Aside from the basic driver-signing interface, you can also use the File Signature Verification utility to check existing files on your computer to make certain they are digitally signed. This is a great way to check and see if any files have been altered on your computer. You can search for files, and you can also configure the tool to create a log file. The File Signature Verification utility is available on the Tools menu of System Information, or you can start it from the run line using the **Sigverif** command.

Managing Display Devices

Display drivers have been a problem for years. When they are installed and configured correctly with the correct driver, they work great. When they are configured correctly with the wrong driver, you end up in Safe Mode. The trick with displaying devices, such as all hardware in Windows XP, is simply this: Use video cards that are compatible with Windows XP, and use the appropriate driver for the video card you are using.

If you follow these two simple rules, display device management is typically easy. However, in a not-so-perfect computing world, several different issues can come into play. Windows XP is the best operating system for display device management that Microsoft has produced. You can make changes to video cards without rebooting — you can reinstall drivers without rebooting (most of the time) — and Windows XP supports multiple monitors. Essentially, you are getting everything from Windows 98, Me, and 2000 in the XP operating system. The following sections explore the installation, configuration, and management of display devices.

Installing Video Cards

A video card is like any other internal card installed on a computer. Video cards are typically installed in an Industry Standard Allotment (ISA) or Accelerated Graphics Port (AGP) slot on the computer. Upon reboot, Windows XP can automatically detect and install the video card. You can specify a driver for the card using Device Manager, and, in many circumstances, video cards will have their own setup routines that you run from a CD. These setup routines install the necessary drivers that provide features of the card, such as 3-D graphics and related visual technologies.

As previously mentioned, the trick to installation success is to only use video cards listed on the HCL at `www.microsoft.com/hcl`. The HCL changes often, so check the Web site for the latest iteration. Make sure you have the most current driver and that the driver is compatible with Windows XP. Should the installation of the video card fail, you can reboot using the Last Known Good Configuration or Safe Mode/VGA Mode.

Configuring Display Properties

Display properties are configured using Display in the Control Panel, or more easily by right-clicking an empty area of the desktop and clicking Properties. If you click the Settings tab, you see a few different options to configure the display properties and video card performance to meet your needs. The following steps show you how to configure the display properties:

1. Right-click an empty area of the desktop and click Properties. Click the Settings tab. You see the basic settings options, as shown in Figure 6-8.

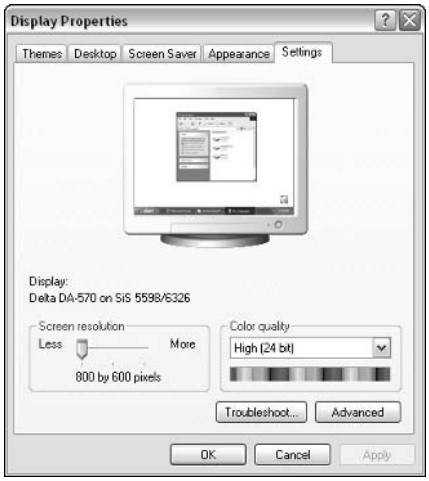

Figure 6-8: Settings tab.

2. In the left portion of the tab, you see the option to adjust the screen resolution. To change the screen resolution, drag the slider bar to a different location. Click Apply. A Monitor Settings window appears where you can choose to keep the new settings or not (you have 15 seconds before the setting reverts to the previous setting).
3. You can next adjust the color quality settings by using the drop-down menu. Generally, you want to use the highest-quality color settings that the video card can support (such as 32-bit).
4. Click the Advanced button on the Settings tab. Several additional tabs appear. The standard tabs you see are as follows:
   - General
   - Adapter
   - Monitor
   - Troubleshoot
   - Color Management

   You may see additional tabs, as well. These tabs are specific to the computer's video card and are determined by the video card software that you install.

5. On the General tab, shown in Figure 6-9, you have two sections: Display and Compatibility. Under Display, you can change the Dots Per Inch (DPI) setting to compensate for small screen items under your current resolution. The default is 96. This feature, however, does not adjust font or color sizes. Under Compatibility, you can have the computer restart after changes are made to display settings. This feature is available because some programs may not work correctly if no reboot occurs after setting changes. The default setting is to Apply the new display settings without restarting, but you can choose a different radio button option, depending on your needs.

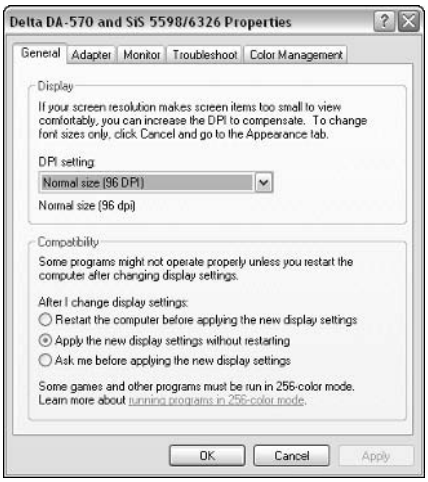
Delta DA-570 and SiS 5598/6326 Properties
General
Adapter
Monitor
Troubleshoot
Color Management
Display
If your screen resolution makes screen items too small to view comfortably, you can increase the DPI to compensate. To change font sizes only, click Cancel and go to the Appearance tab.
DPI setting:
Normal size (96 DPI)
Normal size (96 dpi)
Compatibility
Some programs might not operate properly unless you restart the computer after changing display settings.
After I change display settings:
Restart the computer before applying the new display settings
Apply the new display settings without restarting
Ask me before applying the new display settings
Some games and other programs must be run in 256-color mode. Learn more about running programs in 256-color mode.
OK
Cancel
Apply

Figure 6-9: General tab.

6. On the Adapter tab, you can read basic information about your video adapter. You can also click Properties to access the Device Manager's properties pages for the video card. If you click the List All Modes button, you see all screen resolution modes that the video card supports, as shown in Figure 6-10.

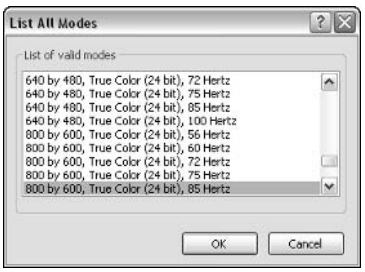
List All Modes
List of valid modes
640 by 480, True Color (24 bit), 72 Hertz
640 by 480, True Color (24 bit), 75 Hertz
640 by 480, True Color (24 bit), 85 Hertz
640 by 480, True Color (24 bit), 100 Hertz
800 by 600, True Color (24 bit), 56 Hertz
800 by 600, True Color (24 bit), 60 Hertz
800 by 600, True Color (24 bit), 72 Hertz
800 by 600, True Color (24 bit), 75 Hertz
800 by 600, True Color (24 bit), 85 Hertz
OK
Cancel

Figure 6-10: List All Modes.

7. On the Monitor tab you can access the Device Manager properties for the monitor by clicking the Properties button. You can also adjust the screen refresh rate. Higher refresh rates reduce flicker that may appear on the screen; you'll need a quality video card to use a higher refresh rate. Default settings typically fall around 75 to 85 Hz. Also note the setting that allows you to hide modes that the monitor doesn't support. This ensures that an incompatible setting cannot be accidentally selected on the Settings tab.
8. On the Troubleshoot tab, you have two setting options. The first enables you to adjust the hardware acceleration of the video card. The typical setting is Full, but you can gradually decrease the setting to troubleshoot performance problems with the video card. Of course, lower acceleration settings also mean lower performance. When you move the slider bar down, you'll see a description of the impact the lower setting will have on video performance. You also have the option to use Write Combining. Write Combining provides graphics data to your screen faster, which improves performance. However, some video cards cannot keep up with this setting. If you are having distortion problems, try clearing this check box.
9. The Color Management tab allows you to choose a color profile if your computer needs to use one. If you click the Add button, you see a list of profiles that are available by default. You can choose a color profile specific for your monitor's make and model, and this might improve color performance. As a general rule, unless you have color-specific problems, do not use a color profile, as this may limit your monitor's color capabilities.

Using Multiple Monitors

Windows 98 introduced support for multiple monitors, and Windows XP continues that support. With more than one monitor, you can run different applications on different screens and, essentially, increase work productivity. Multiple monitors are useful to many different people, especially those working with multiple documents and graphics files. With Windows XP and the right hardware, you can connect up to 10 individual monitors to a single PC.

When using multiple monitors, you can place different applications or files on different monitors, and you can stretch items between monitors. For example, say you have a spreadsheet with many columns. You could use two monitors to stretch the file so that all columns are visible across the two monitors.

When using multiple monitors, one monitor serves as the primary monitor where older applications and the Windows logon screen will appear. You can use multiple video cards with different settings, or you can use a single video card that has multiple outputs where you can connect the monitors. Regardless of the configuration you choose, you use Display properties to adjust the appearance of each monitor.

Working with Multiple Processors

As with Windows 2000, Windows XP supports multiprocessor computers. The use of multiple processors on one computer increases the computer's ability to handle tasks and is particularly useful for Windows XP computers that function as network file and print servers, increasing the processor speed; and with two processors available to Windows XP, it can work faster and meet the needs of local and network processes.

Essentially, Windows XP must be able to divide the workload between the processors into even pieces to utilize the processors. This process, called multitasking, enables the operating system to juggle processor requests between the two processors. Windows XP Professional is a true multitasking operating system that uses a type of multitasking called preemptive multitasking. Preemptive multitasking systems have the ability to manage and control applications and processor cycles. Because the Windows XP kernel remains in control of all resources, the operating system can halt applications or make them wait, or preempt them. With this kind of power and control, Windows XP can divide tasks between processors and determine what processor performs which task.

Windows XP Professional can support two Intel-based processors. Windows XP does not support other processor types, such as Alpha or MIPS, so for multiprocessor functionality to work, two Intel-based processors must be used. If you install Windows XP Professional on a computer with two Intel-based processors, the processors should be detected and installed during Windows XP setup.

Windows XP also supports a dual-view feature. Basically, this is the same thing as multiple monitors, but it is used on laptop computers where the liquid crystal display (LCD) screen is always the primary monitor, and the attached monitor serves as a second viewing area.

When setting up multiple monitors, keep a few basic rules in mind:

- If the computer has a video adapter built into the motherboard, the built-in adapter must be used as the VGA device.
- Monitors in the multiple monitor setup must use either Peripheral Component Interconnect (PCI) or AGP slots.
- The PCI and AGP cards cannot use VGA resources.
- Only Windows XP-compatible drivers can be used on the monitors.

To set up a multiple monitor configuration, just follow these steps:

1. Turn off the computer. Follow the manufacturer's instructions to install the new PCI or AGP video card.
2. Attach a monitor to the new card and boot the computer.
3. Windows XP plug and play will detect the new card and install it.
4. Right-click an empty area of the desktop and click Properties. Click the Settings tab. You'll see two monitor icons on the tab. Select the monitor that you want to use as the secondary monitor. If a monitor is an onboard video adapter built into the motherboard, it must be the primary monitor.
5. Click the Extend my Windows desktop onto this monitor check box.
6. Adjust the resolution and color scheme settings as desired for the monitor. Click OK.
7. To add additional monitors to the configuration, repeat Steps 1 through 6.

Working with Disk Devices

Disk management in Windows XP provides you with a number of configuration options that are more flexible than ever before. Building on volume management first introduced in Windows 2000, you can use multiple hard disks and create virtually unlimited numbers of volumes.

Windows XP hard disk configuration and management are covered in Chapter 7, so refer to that chapter to learn more about volume and disk management.

This section, however, focuses on removable drive management, specifically, CD/DVD-ROM drives and other removable media drives (such as tape drives). CD and DVD-ROM drives (or combo drives) are standard on computers today and, in many cases, computer systems now have multiple CD/DVD drives and CD read/write drives. Like any hardware device, internal CD/DVD drives must be attached to the system and detected by plug and play. You can then install the manufacturer's driver, and often you'll get additional software, such as third-party media players and CD burner software. CD/DVD-ROM drives and CD read/write drives work better than ever before with Windows XP, and plug and play makes them easily identified. With DVD drives, you can watch movies on your Windows XP screen. Standard playback features, such as Dolby Digital, are supported and used for DVD playback. For CD-ROM drives, the CD-ROM File System (CDFS) is used. For DVD discs, the Universal Disk Format (UDF) file system is used. CDFS and UDF are industry standards natively supported in Windows XP.

As with all hardware, the trick when installing new internal or external CD-ROM devices is to use devices that are listed on the HCL and make sure you have the most current driver. A secondary note about installation concerns audio playback. If you expand the CD/DVD category in Device Manager, you'll see your CD/DVD-ROM drives listed. If you right-click the desired CD/DVD-ROM drive and click Properties, you'll see a Properties tab. As you can see in Figure 6-11, you can adjust the AutoPlay options here, and you can also determine whether or not the drive is allowed to play CD music. If you are having problems with a CD-ROM drive not playing music, be sure to check the setting on this tab.

Figure 6–11: CD Drive Properties tab.

You can also check the Volumes tab and see the CD's partition setup, its capacity, status, and other general information about the state of the disc.

Aside from these configuration options, you can also right-click the disk in My Computer and click Properties. This gives you the same tabs you see with other hard disks. For removable discs, however, you'll also see an AutoPlay tab. This tab, which is new in Windows XP, enables you to select a default action that should occur when a certain type of file is opened from the removable disc. You can select from a list of possible programs that can open the disc (such as Windows Media Player) and you can also use the prompt option to choose which action you want to take for a particular file.

Refer to Chapter 7 for more information on the Properties tabs you'll find with other hard disks.

Other types of removable media drives function in the same basic way, including the following:

- Zip
- Jaz
- Tape drives

You can install them by connecting them to an appropriate port and allowing plug and play to detect the drives. From that point, you can install an appropriate driver. Concerning tape drives for backup purposes, Windows XP supports a number of industry standard drives, and you can support them using Windows XP's Removable Storage Console found in Computer Management.

Chapter 7

Managing the Hard Disk

IN THIS CHAPTER

- Exploring FAT and NTFS
- Using dynamic disks
- Managing disks with disk properties

AT FIRST GLANCE, CONFIGURING and managing a computer's hard disk might not seem like an exciting event. After all, the purpose of a hard disk is simply to store information. This includes everything from operating system files to your personal files and folders that you create on Windows XP. However, that storage system, much like an efficient filing cabinet, can make your work with Windows XP much more effective. In fact, several helpful hard disk solutions are available in Windows XP that you should consider taking advantage of. This chapter explores those features and explains how to use them.

Working with File Systems

Every computer disk must have some kind of file system. The file system makes the hard disk usable by the operating system so that the operating system can store data on the disk. Windows XP supports both the File Allocation Table (FAT32) file system and the NT file system (NTFS).

Before exploring the two file systems supported by Windows XP, consider the basics of how a file system works. Hard drives are typically installed in a computer in an unformatted state, meaning that the operating system is unable to write and read data from the hard disk. Without file folders, there is no way to organize and store information on the hard disk. So, to use the hard disk, Windows XP Professional must write a signature to a hard disk and format it with a file system to be able to read and write to that disk.

When the hard disk is formatted, magnetic rings are created on the disk and the disk is divided into circular areas called *sectors*. Sectors are then grouped together in *clusters*. Clusters are logical areas of the disk that the operating system uses to write data to. Depending on how the operating system handles cluster size, the disk can hold more or less data due to space that is lost on cluster size configuration.

FAT and FAT32

When formatting the disk, the operating system writes a file system to the disk, which is a way to organize and manage data on that disk. The first file system supported by Windows XP is the File Allocation Table (FAT) file system. FAT16 was first developed, with a 32-bit version appearing a few years later. FAT16 is a basic file system that was designed to support small disks. Under Windows XP Professional, the FAT16 file system can grow up to 4 GB in size, and supports file sizes up to 2 GB. In other words, 4 GB is the maximum amount of cluster storage space and management functionality that FAT16 provides. This, of course, is hopelessly small in today's computing environments. FAT16 is supported on Windows 3.1 and higher Microsoft operating systems. Under most circumstances, FAT16 would never be used on a Windows XP Professional operating system (or even earlier systems, such as Windows 98) unless you needed to dual-boot with an older operating system, such as Windows 3.1 and the original version of Windows 95. Since few of us are using Windows 3.*x* or Windows 95 any longer, there is simply no need to use FAT16.

FAT32 is significantly different from FAT16 in several ways. First available for Windows 95b, FAT32 supports larger hard drives and smaller file clusters. In other words, you can make use of a large hard drive while simultaneously conserving disk space due to the small cluster size. Less room is wasted on the hard disk. FAT32 supports 32-GB drives. For these reasons, FAT32 is the operating system of choice for Windows 95b, Windows 98, and Windows Me operating systems.

NTFS

NTFS is supported under Windows XP and is considered the file system of choice. NTFS has been around since the earlier days of Windows NT, but the new version first supported in Windows 2000 (NTFS v5) provides additional features and functions. NTFS is virtually unlimited because it supports up to 2 terabytes of data, which is a theoretical number because hard disks are not yet capable of supporting this much data. Essentially, there are no limitations with NTFS in terms of drive size. Additionally, NTFS supports many features that are not available under the FAT (16 or 32) file system.

For example, NTFS supports both folder-level and file-level security. You can individually configure files and folders with their own security features, as well as individual security settings for users. NTFS natively supports data encryption. You can encrypt a folder so that no one else can read it, yet continue to use the data in that folder as normal. NTFS also natively supports data compression and logging.

Formatting and Converting Drives to NTFS

With Windows XP, you can format unformatted drives with NTFS, and you can also convert existing FAT drives to NTFS. Keep in mind that this discussion refers to the computer's hard disks. Most removable disks, such as Zip, floppy, and writeable CDs, do not support the NTFS file system. When you install Windows XP, you have

When to Use FAT32

Although NTFS is the best file system, containing numerous features not found in FAT, there are some reasons for implementing FAT. The first and foremost reason concerns dual-boot systems. Windows 9*x* and Me do not support the NTFS file system. So, if you want to dual boot between Windows 9*x*/Me and Windows XP Professional, the Windows 9*x*/Me system will not be able to read any data on the Windows XP Professional partition. In dual-boot cases, it is usually best to find the common-ground file system between the two operating systems; in this case, that is FAT32.

One other reason for using FAT concerns small hard drives. NTFS has a complex structure and some overhead associated with it. Drives that are 2 GB or smaller are best used with FAT. NTFS consumes too much disk space in overhead on drives this small and simply does not work that well. In most cases, the small drive issue is unimportant because the majority of drives today are much larger.

It is important to note here that you do not have to use the same file system on each partition in a dual-boot scenario. The issue is simply that downlevel versions of Windows (Windows Me or earlier) will not be able to access data stored on the NTFS partition. Depending on your needs, however, that may be perfectly fine. Just think in terms of data access when you are considering file systems in dual-boot scenarios.

the option to choose with which file system you want to format the disk; however, what about existing drives? You can easily convert them, but you should keep two basic rules in mind:

- You can convert a FAT or FAT32 drive to NTFS while preserving your data. Conversion is a one-way process, however. Once you convert to NTFS, you cannot revert back to FAT without reformatting the disk.
- You cannot convert an NTFS drive to FAT or FAT32 without reformatting the drive. This means that all of your data on the hard disk will be destroyed during the formatting process. You will have to restore all of the data from backup.

Refer to Appendix A for more information on installing Windows XP.

So, the issue to keep in mind is simply that converting to NTFS is a one-way process. Although the conversion process is safe and effective, volumes that are converted lack some of the performance benefits of drives that were initially

formatted with NTFS. Also, the Master File Table is different on converted volumes, which also affects performance to a degree. Still, conversion is the easiest way to change a FAT drive to NTFS without reformatting and having to restore data currently held on the FAT volume. Converting to NTFS is easy, and the following steps show you how:

1. Click Start → Run. Type **command** and click OK.
2. At the command prompt, you will use the **convert** command to convert the FAT drive to NTFS. Keep in mind that the conversion process is completely safe and all of your data will remain as it is. The command and syntax are as follows:

   ```
   convert driveletter: /FS:NTFS.

   Press Enter.
   ```

3. Conversion may take several minutes, depending on the size of the drive. When the process is complete, simply exit the command interface. If you converted the boot partition, you will be prompted to reboot the computer.

Managing Hard Disks

Windows XP continues the tradition of dynamic disks that first began in Windows 2000. The goal of disk management in Windows XP is to give you flexibility and disk management options that are easy to work with. As such, Windows XP gives you a disk management console found in Computer Management, which is available in Start → Control Panel → Administrative Tools → Computer Management. Select Disk Management in the left console pane and you can see the disks and their configuration in the right console pane, as shown in Figure 7-1.

Converting a Basic Disk to a Dynamic Disk

Windows XP Professional supports two kinds of disks: basic and dynamic. A basic disk is a standard hard disk that supports standard configurations. A basic disk can have a primary partition and extended partitions that make up logical disk drives. For example, you can configure the basic disk so that it has a C drive (primary) and a D drive (extended). You can use the D drive for storage or other purposes (or to set up a dual-boot configuration). On a basic disk, you can have up to four primary partitions, or alternative configurations, such as three primary partitions and one extended partition, and so on. One of the primary partitions is considered active and is used to start the computer. This active partition contains your boot files and the master boot record. Basic disks behave just as disks have in the past and do not provide the advanced management features supported under Windows XP Professional. Disks are always basic when first installed, but you can convert them to dynamic to take advantage of all that Windows XP Professional has to offer.

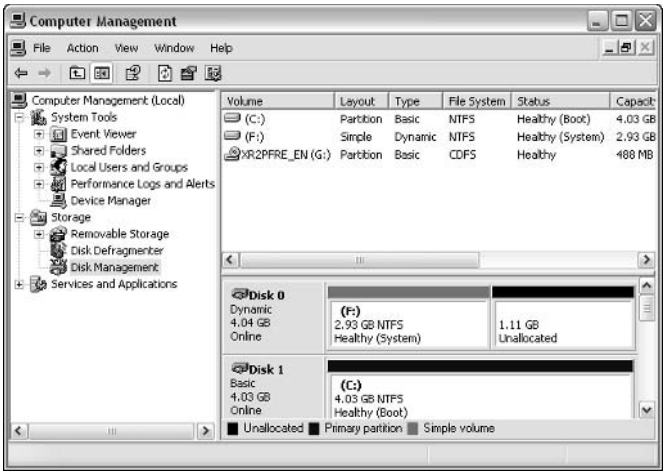

Figure 7-1: Disk Management console.

As a general rule, you should always convert a Windows XP computer's hard disks to dynamic disks so you can take advantage of the management features explored in the rest of this chapter. Of course, if you are dual booting with a downlevel operating system, you should keep the disk a basic disk.

A dynamic disk is a drive configured by the Disk Management console so that it can support volume management. A volume is simply a logical organization of a disk for storage purposes. With volume management, you are not limited to a primary partition and a few extended partitions. Volumes give you the flexibility to divide up a disk in any way that is helpful to you. Volumes are much more flexible and much easier to work with. The Disk Management utilities configure the drive so that it can make use of Windows XP Professional's disk management features. In essence, if you want to take advantage of volume management and lose the partition restrictions placed on basic disks, you need to convert the disk to a dynamic disk. (If not, no performance features are associated with dynamic disks, so there are no reasons to convert.) You can easily convert your existing drives to dynamic disks. The following steps show you how to convert a basic disk to a dynamic disk:

1. In Disk Management, right-click the Disk number in the graphical portion of the Disk Management display, and click Convert to Dynamic Disk. You can also click Action → All Tasks → Convert to Dynamic Disk.
2. In the Convert to Dynamic Disk window, shown in Figure 7-2, select the disk that you want to convert and click OK.

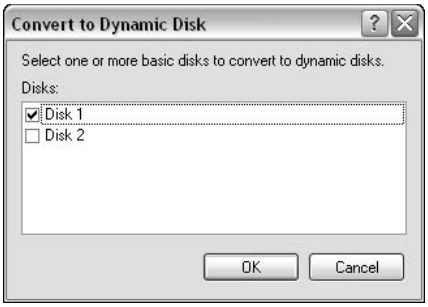

Figure 7-2: Convert to Dynamic Disk dialog box.

3. In the Disks to Convert window, review the settings, as shown in Figure 7-3. Click Convert to continue.

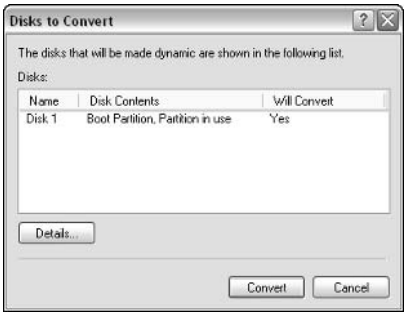

Figure 7-3: Conversion summary.

4. You will see a message telling you that other operating systems will not be able to start from the disk once the conversion has taken place (this means all other operating systems such as NT, 9*x*, and Me). Click OK to continue.
5. You might see a message telling you that any mounted disks need to be dismounted. Click OK to continue.
6. The conversion process occurs and you are prompted to reboot the computer. After you reboot, you can see that the disk's status has changed from basic to dynamic in the Disk Management console.

Working with Dynamic Disks

After a basic disk has been converted to a dynamic disk, you can begin taking advantage of the features of dynamic disks. Dynamic disks give you information

about the status of the disk, and you can create various types of volumes, as needed. The following sections explore these features.

DYNAMIC DISK STATES

Dynamic disks are capable of displaying several different states. This information tells you the current status of the disk and helps you understand problems that may exist. The following list explains the states that a dynamic disk might display:

- **Online** – The disk is online and functioning with no errors.
- **Online (Errors)** – The disk is online, but errors have occurred. These errors are usually minor and can be fixed by running the Error Checking tool found on the Tools menu of the disk's properties.
- **Offline** – The disk is not accessible. This problem can occur because of corruption or an input/output (I/O) problem. Try right-clicking the disk and clicking Reactivate Disk to bring the disk back online.
- **Missing** – The disk is not accessible, is disconnected, or corruption has caused the disk to be unreadable. Try right-clicking the disk and clicking Reactivate Disk to bring the disk back online.
- **Initializing** – This message occurs when the disk is temporarily unavailable because of a conversion to dynamic state.
- **Not Initialized** – This message occurs when you've installed a new disk and the disk does not have a valid signature. When the Disk Management utility appears, the disk appears as Not Initialized. To write a valid signature so that you can format and begin using the disk, simply right-click the disk and click Initialize.
- **Foreign** – This status appears when a physical, dynamic disk is moved from a Windows 2000/XP Professional computer to another Windows 2000/XP Professional computer. When this message appears, right-click the disk and click Import Foreign Disk.
- **Unreadable** – This status appears when I/O errors keep the disk from being readable. Go to Action → Rescan Disks to fix the problem.
- **No Media** – This status appears on removable drives when no media is inserted into the drive.

CONFIGURING DRIVE LETTERS AND PATHS

Windows XP makes drive letter and path configuration easy. You can assign a drive any alphabet letter, and you can also assign a drive to an empty NTFS folder. If you want to make a change to a dynamic disk volume, simply right-click the volume in the Disk Management console, and click Change Drive Letter and Paths. A Change Drive Letter and Paths window appears, as shown in Figure 7-4.

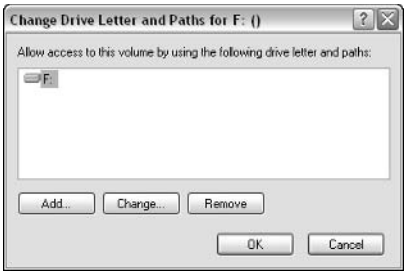

Figure 7-4: Change Drive Letter and Paths window.

From this window, you can perform the following actions:

- **Add** – If you click the Add button, a second window appears where you can mount the drive to an empty NTFS folder (which is discussed later in this section). You cannot assign multiple drive letters for the same drive.
- **Change** – If you click the Change button, the Change Drive Letter or Path window appears, as shown in Figure 7-5. You can choose a different drive letter from the drop-down menu.

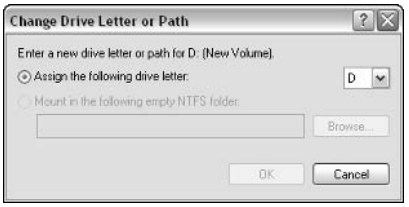
Change Drive Letter or Path
Enter a new drive letter or path for D: (New Volume).
Assign the following drive letter:
D
Mount in the following empty NTFS folder:
Browse...
OK
Cancel

Figure 7-5: Change option.

- **Remove** – You can also remove the drive letter. Dynamic disks do not require that a drive letter or path identify a drive. However, some programs might not function if you remove the drive letter, nor will you be able to access the drive.

Aside from assigning a different drive letter, you can also mount a volume to a local, empty NTFS folder. The purpose is to give you freedom and flexibility beyond the 26-letter alphabet limitation. When you mount a volume to an empty NTFS folder, a drive path is used instead of a drive number. For example, say that you have a local volume that is only used for storage. You could create an NTFS folder called Storage, and mount the drive to the empty storage volume. You can then access the drive by simply accessing `C:\Storage`, just as you would a folder. The end result is that you can have an unlimited number of drives and use them like folders rather than standard drive letters that you must keep track of. You can use both a drive letter and a mounted volume on the same drive, if you like. Keep in

mind that the drive must be mounted to an empty folder. After the mount takes place, you can move data to that folder to store it on the volume.

Remember that the mounting option only works on NTFS folders. You cannot mount to a folder on a FAT drive.

To mount a drive to an empty NTFS folder, just follow these steps:

1. In the Disk Management window, right-click the volume that you want to mount to an empty NTFS folder and click Change Drive Letter and Paths.
2. In the Change Drive Letter and Paths window, click the Add button.
3. In the Add Drive Letter or Path window, shown in Figure 7-6, select the mount radio button, and then enter the path to the folder that you want to mount, or click the Browse button to select the folder.

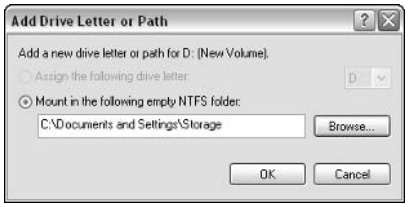

Figure 7-6: Folder mount option.

4. If you Browse for the folder, a browse window appears, as shown Figure 7-7. You can locate the folder or create a new one by clicking the New Folder button. Make your selection and click OK.

Figure 7-7: Browse for or create a new NTFS folder.

5. Click OK again in the Add Drive Letter or Path window.

Working with Disk Volumes

Using dynamic disks, you open a world of management possibilities, and you lose the restrictions you often faced with basic disks. When a disk is first converted to a dynamic disk, it will appear in the disk console as unallocated space. This means that the disk has no volumes and has not been formatted. The disk is not usable by the operating system in its current state. Figure 7-8 shows you an unallocated disk in the Disk Management console. This disk has been converted to dynamic, but has no volumes and no file system. To use a dynamic disk, you'll need to create and format disk volumes. The following sections show you the different kinds of volumes that are available to you and how to create them.

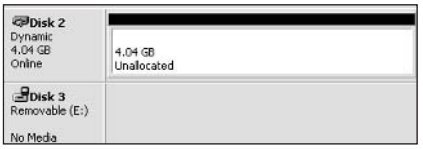

Figure 7-8: Browse for or create a new NTFS folder.

Creating Simple Volumes

A simple volume is a standard disk volume. It is a unit of disk space that has been configured and formatted so that it can be used to store data. A hard disk can be formatted as one volume, or you can format a portion of it so that you can use multiple disk volumes. The following steps show you how to create a simple disk volume.

1. In the Disk Management console, right-click the dynamic disk's unallocated space and click New Volume.
2. The New Volume Wizard appears. Click Next to continue.
3. In the Select Volume Type window, shown in Figure 7-9, click the Simple radio button and click Next.
4. In the Select Disks window, shown in Figure 7-10, select the disk that you want to configure (which is already selected for you under this wizard), then enter the size of the volume (in megabytes) that you want to create. The maximum amount of space available is listed here for you, as well. Click Next.
5. In the Assign Drive Letter or Path window, choose a drive, assign an empty NTFS folder, or do not assign either. Click Next.
6. In the Format Volume window, shown in Figure 7-11, you can choose to format the volume or not, and you can choose to use the quick format feature and enable file and folder compression for the volume. Make your selections and click Next.

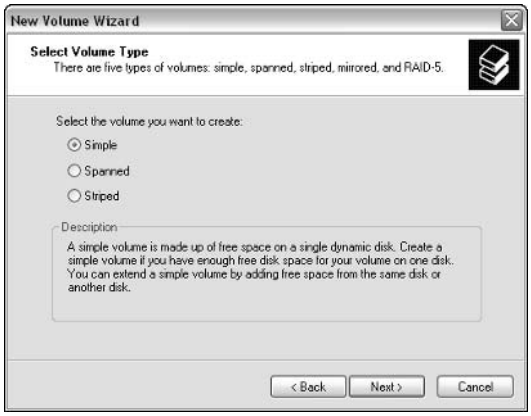
New Volume Wizard
Select Volume Type
There are five types of volumes: simple, spanned, striped, mirrored, and RAID-5.
Select the volume you want to create:
Simple
Spanned
Striped
Description
A simple volume is made up of free space on a single dynamic disk. Create a simple volume if you have enough free disk space for your volume on one disk. You can extend a simple volume by adding free space from the same disk or another disk.
< Back
Next >
Cancel

Figure 7-9: Choose the Simple volume option.

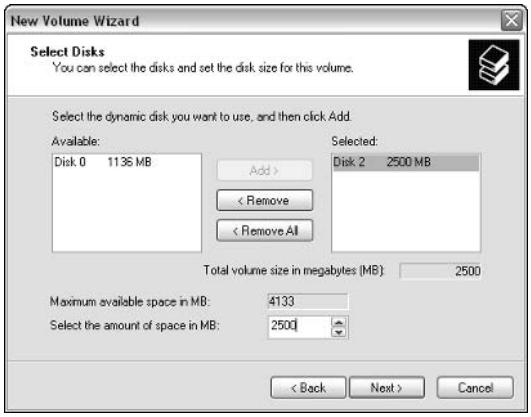
New Volume Wizard
Select Disks
You can select the disks and set the disk size for this volume.
Select the dynamic disk you want to use, and then click Add.
Available:
Disk 0 1136 MB
Add >
< Remove
< Remove All
Selected:
Disk 2 2500 MB
Total volume size in megabytes (MB): 2500
Maximum available space in MB: 4133
Select the amount of space in MB: 2500
< Back
Next >
Cancel

Figure 7-10: Select the disk and the desired megabyte space for the volume.

New Volume Wizard
Format Volume
To store data on this volume, you must format it first.
Choose whether you want to format this volume, and if so, what settings you want to use.
Do not format this volume
Format this volume with the following settings:
File system: NTFS
Allocation unit size: Default
Volume label: New Volume
Perform a quick format
Enable file and folder compression
< Back
Next >
Cancel

Figure 7-11: Format volume.

7. Click Finish. The new volume is created and appears in the Disk Management window.

Extending a Simple Volume

Say that you create a simple volume with a certain amount of space. You still have extra free space on the same disk. At a later time, you decide that the volume should have been larger. You do not have to remove your data from the volume and create a new one; you can simply extend the existing volume by grabbing some of the additional unallocated space on the disk. This feature allows you to quickly gain additional space without any harm to your data currently stored on the existing volume. For example, say you have a 10-GB volume and 2 GB of free space available on the same disk. You can extend the 10-GB volume and include the 2 GB of free space to create a 12-GB volume. You can do all of this without damaging the data stored on the original 10-GB volume.

To extend a volume, right-click on the volume and click Extend Volume. The Extend Volume Wizard appears. The wizard basically works in the same way as the New Volume Wizard. Simply walk through the wizard steps and determine the amount of space you want to add to the existing volume. The extended volume will appear as a new volume in the Disk Management console, but it is actually an extension of the existing volume.

Creating a Spanned Volume

Aside from the simple volume, Windows XP Professional also supports spanned volumes. A spanned volume combines areas of unallocated space on multiple disks into one logical volume. You can combine between 2 and 32 areas of unallocated space from different drives. For example, say that a computer has three hard drives. On each drive there is about 500 MB of unallocated free space. A 500-MB volume is rather small and not very practical for everyday use. However, using the spanned volume option, you could combine all three 500-MB areas of unallocated space to create a 1.5-GB volume. You can then use the volume, as if the storage was located on a single disk. Essentially, this configuration gives you more flexibility and fewer volumes (and drive letters to keep up with), and makes good use of leftover space.

After the spanned volume has been created, you see it as any other volume in My Computer or Disk Management. It is important to note, however, that spanned volumes are storage solutions only – they do not provide any fault tolerance. If one disk in the spanned volume fails, all data on the spanned volume is lost. However, you can back up a spanned volume just as you would any other volume.

Like a simple volume, you can easily extend a spanned volume at any time by adding existing free space. However, you cannot remove a volume from a spanned volume without losing the entire volume, so keep this issue in mind as you plan your disk configuration.

To create a spanned volume, follow these steps:

1. In the Disk Management console, right-click one of the areas of unallocated disk space on one of the disks and click New Volume.
2. The New Volume Wizard appears. Click Next to continue.
3. In the Select Volume Type window, shown in Figure 7-12, click the Spanned option, and then click Next.

New Volume Wizard
Select Volume Type
There are five types of volumes: simple, spanned, striped, mirrored, and RAID-5.
Select the volume you want to create:
Simple
Spanned
Striped
Description
A spanned volume is made up of disk space on more than one dynamic disk.
Create a spanned volume if you need a volume that is too large for a single disk.
You can extend a spanned volume by adding free space from another disk.
< Back
Next >
Cancel

Figure 7-12: Create a spanned volume.

4. In the Select Disks window, the current disk appears in the selected dialog box. Choose the free space on the desired disk(s) that appears on the Available window and click the Add button. Repeat the process until all unallocated areas that you want to use appear in the Selected box. Click Next.
5. In the Assign Drive Letter or Path window, choose a drive letter or mount the drive to an empty NTFS folder. You can also choose not to assign a drive letter or path at this time. Click Next.
6. In the Format Volume window, choose whether or not to format the volume at this time and whether or not to perform a quick format and enable file and folder compression. Click Next.
7. Click Finish. The volume is created and now appears in the Disk Management console.

Creating Striped Volumes

Striped volumes are similar to spanned volumes in that they combine areas of free disk space (between 2 and 32 areas of unallocated space on different drives) to create one logical volume. However, the big difference is that striped volumes write

data across the disks instead of filling one portion of free space first, then the next portion, and so on. You are likely to see faster read and write performance than you will with a simple spanned volume. Like a spanned volume, you can create a striped volume by right-clicking one of the areas of unallocated space and clicking Create Volume. In the Create New Volume Wizard, choose to create a striped volume, and follow the same steps that appeared in the previous section.

Another important point concerning striped volumes is that the areas of unallocated free space must be the same size. For example, say that you want to use 500-MB, 800-MB, and 900-MB areas of unallocated disk space to create a striped set. Since the areas have to be the same size, Disk Management will configure 500 MB from each disk, which means that you will still have some unallocated space left over. This configuration enables data to be written evenly across the disks.

Finally, keep in mind that striped volumes are storage solutions designed to provide better performance. They do not, however, provide any fault tolerance. If one disk in the stripe fails, all of your data stored on the stripe will be lost. So, make sure you have an effective backup plan.

See Chapter 17 to learn more about backing up your data.

Using Hard Disk Properties

As with most elements of the Windows XP operating system, hard disks also contain properties pages that you can access from My Computer by simply right-clicking on the disk and clicking Properties. The properties pages give you a few important feature tabs that you should keep in mind as you manage hard disks on Windows XP, including the following:

- General
- Tools
- Hardware
- Sharing
- Quota
- Security

Where is the fault tolerance?

As you have been working with the Add Volume Wizard, you may have noticed references to some additional volume solutions that are fault tolerant. In reality, Windows XP Professional does not support any kind of disk fault tolerance, unlike Windows 2000/.NET Server. The references refer to Microsoft's overall disk management solutions, even though the fault tolerant options are not available on Windows XP Professional or even Windows 2000 Professional, for that matter.

As an FYI, the two types of fault tolerance available on Microsoft server software are Disk Mirroring and RAID 5. Disk mirroring, which is supported on dynamic disks in Windows 2000 Server (also called RAID 1), requires two physical disks. When a disk mirror is configured, one disk volume maintains an exact copy of the first disk. In the event that one of the disks fails, you always have a redundant copy. The good feature of disk mirroring is that you have a redundant disk copy that can be easily used in the event that a single disk failure occurs. The bad news about disk mirroring is the megabyte cost. Because you are maintaining an exact copy of a volume, everything you save requires twice as much storage space as it normally would. Still, for critical servers that must be up and running quickly, disk mirroring is a great choice.

The second type of fault tolerance supported under Windows 2000/.NET Server is RAID 5 volumes. RAID stands for Redundant Array of Inexpensive Disks, and it is a standard that uses three or more dynamic disks to store data. Using a *parity bit*, which is a mathematical formula, data is written across the disks in stripe fashion. Should a single disk fail, the data can be regenerated from the remaining disks. You can use up to 32 physical drives for a RAID 5 volume, but RAID 5 volumes cannot hold the system or boot partition.

The following sections review these tabs in greater detail.

General Tab

The General tab, shown in Figure 7-13, gives you a quick way to view information about the disk, such as disk type, file system, used space, and free space. You can also launch the Disk Cleanup Wizard here, which inspects the drive for items that can possibly be deleted to free up space on the disk. Notice at the bottom of the window that you can compress the entire disk to conserve space, and you can index the drive so that searches work better and faster. These features have no negative effect on your data.

Figure 7-13: General tab.

Tools Tab

The Tools tab, shown in Figure 7-14, gives you three different tools that you can use to administer and manage the physical disk. The first tool is the Error-checking tool, formerly called ScanDisk. Error-checking inspects the disk for file system problems and disk surface problems. When you choose to use the Error-checking tool, you have the option to fix file system errors and scan for and fix bad disk sectors. This tool can be very helpful if you are experiencing disk problems, but it does need exclusive access to the disk, which may require you to reboot before it can run.

Figure 7-14: Tools tab.

The next tool is the disk defragmenter. The disk defragmenter is able to correct fragmentation in the file system, which occurs over time, and files are saved, changed, and moved.

Because disk defragmentation is a performance issue, this tool is examined in more detail in Chapter 18.

The final tool is the Backup utility, which can also be accessed from the Computer Management console. Using the backup utility, you can perform a number of different system, application, and data backups on your computer, and you can also restore data in the event that it is lost due to hardware failure or another mishap.

Refer to Chapter 17 for more information on the backup features provided in this utility.

Hardware Tab

The Hardware tab, shown in Figure 7-15, gives you a listing of all disk drives on the computer. You can select a disk and click Properties to access the Device Manager properties sheets for the disk, or you can click the Troubleshoot button if you want Windows XP to try and help you solve problems with the disk.

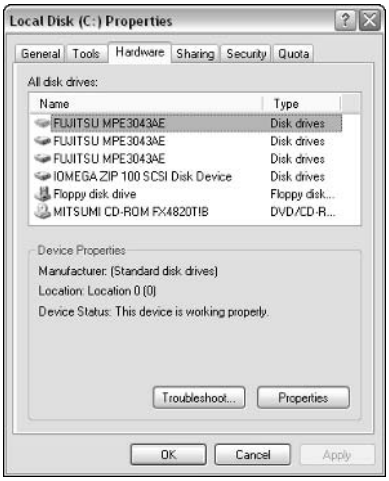

Figure 7-15: Hardware tab.

Sharing Tab

The Sharing tab enables you to share the entire disk and configure permission and caching settings allowed when the disk is shared.

You can learn all about resource sharing in Chapter 15.

Security and Quotas

If simple file sharing is not in use, you'll see a Security tab, which is the standard Security tab you see on all shared resources. Using the Security tab, you can configure access to the disk and permissions for local and domain users.

You also see a Quota tab. Disk quotas allow network users to store data on your computer, as in the case of a file server. Using disk quotas, you can determine how much data they can store along with storage warnings.

See Chapter 15 to learn more about security, and see Chapter 16 to learn more about disk quotas.

Chapter 8

Working with Folders and Files

IN THIS CHAPTER

- Managing folders
- Configuring encryption and compression
- Working with offline files

FILES AND FOLDERS ARE the mainstay of Windows; after all, you spend most of your time working with various files and folders. Windows XP Professional provides a number of helpful tools and features that make files and folders easier to use, manage, and customize to meet your needs. This chapter explores these features and options.

Working with Folders

In terms of managing files, folders are your best friends. As a storage location, a folder is simply a holding place where you can organize all kinds of data on your computer, from documents, photos, and spreadsheets, to application files. Windows XP gives you more configuration and customization options, along with some great management features that make folders more flexible and useful than they ever have been on Windows. In this section we take a look at what you can do with folders.

Configuring Folder Options

Folder Options, which is a Control Panel icon, is a centralized place where you can configure how all of your folders on Windows XP generally behave and look. You can access Folder Options from either the Control Panel or by clicking the Tools menu in any folder and clicking Folder Options. Either way, you arrive at the Folder Options properties dialog box. It is important to note here that no matter how you access Folder Options, the configuration changes you make in the Folder Options properties dialog box affect all folders on Windows XP. You cannot individually configure these settings for different folders. With that said, the following sections show you what options are available on Folder Options properties.

GENERAL TAB

The General tab, shown in Figure 8-1, contains three major sections that affect folder appearance and functionality.

Figure 8-1: The Folder Options General tab.

- **Tasks** – This option enables you to display Web content in your folders. This includes the blue links you have seen on the left side of your folders (which jump to another location when you click them). Web content also enables your folders to display HTML documents and graphics files, such as thumbnails. To use the Web view, just click the Show common tasks in folders radio button. My Computer and the Control Panel are always displayed with the Web page view, even if you do not select this option. If you want to use the old Windows look, click Use Windows classic folders.
- **Browse folders** – This option enables you to choose how your folders are displayed when you are browsing through a folder structure. For example, say you open My Computer, and then you open the Control Panel. You can have My Computer open in a window, and then have the Control Panel open in a separate window. Or, you can choose to use the same window; so you open My Computer, and when you open the Control Panel, it appears and replaces what you see in My Computer.
- **Click items as follows** – You can have your mouse clicks act as though your Windows XP interface is the Internet. On the Internet, you simply click your left mouse key to open any item because all Internet movement is performed through hyperlinks that connect Web pages and Internet sites together. You can have your computer act this way so that you only have to point to an item to select it and left-click it one time to open it.

VIEW

The View tab contains a number of check boxes that enable you to make a number of different decisions about files and folders, as shown in Figure 8-2. The options found here concern the display of certain file types, folder views, and other lower-level settings. Windows XP does a good job of configuring the common settings for you, but different settings here can be helpful. The following list points out some of the more common options and whether those options are enabled by default.

- **Do not show hidden files and folders and Hide protected operating system files** – These two separate options, both of which are enabled by default, do not show hidden files and folders in Windows XP. Windows XP hides many of the files and folders that hold operating system files that make Windows XP run. You don't need to do anything with these files, so Windows XP hides them to help prevent tampering or accidental deletion.
- **Hide extensions for known file types** – This option hides file extensions. For example, say you type a Microsoft Word document called Development. The document's official name is Development.doc. The hide extensions option hides the .doc extension and all other extensions for files that Windows recognizes. This makes your folder files cleaner and easier to read. This option is enabled by default.
- **Remember each folder's view settings** – You can use the View menu in a particular folder to determine how the folder appears and what you can view (you will learn about these options later in this chapter). This setting tells Windows to remember each folder's view settings. This option is enabled by default, and you should keep it enabled.

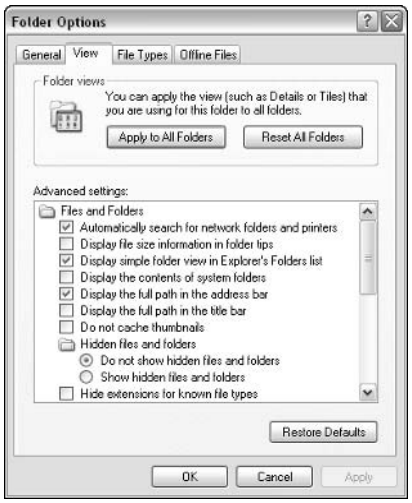
Folder Options
General
View
File Types
Offline Files
Folder views
You can apply the view (such as Details or Tiles) that you are using for this folder to all folders.
Apply to All Folders
Reset All Folders
Advanced settings:
Files and Folders
Automatically search for network folders and printers
Display file size information in folder tips
Display simple folder view in Explorer's Folders list
Display the contents of system folders
Display the full path in the address bar
Display the full path in the title bar
Do not cache thumbnails
Hidden files and folders
Do not show hidden files and folders
Show hidden files and folders
Hide extensions for known file types
Restore Defaults
OK
Cancel
Apply

Figure 8-2: Folder Options — View Tab.

FILE TYPES

The File Types tab provides you with a window that lists every type of file supported in Windows XP. Your operating system and applications do a great job of managing this list, so you do not need to perform any configuration here unless explicitly instructed to do so by some application. However, removing file types from this list can prevent certain application files from functioning in Windows XP.

OFFLINE FILES

Offline Files allow Windows XP to store network files locally on your computer and then synchronize your local copy with the network copy. The Offline Files tab enables you to turn on offline file support and configure some basic functions for offline files. You will learn more about using Offline Files later in this chapter.

Configuring Folder Views and Toolbars

Folder Options govern the overall appearance and functionality of folders, yet you can use some additional folder features to customize folders so that they look and behave in a manner that works well for you. In fact, Windows XP has more folder features than ever before, and this section takes a look at your options.

VIEW MENU

The View menu, shown in Figure 8-3, gives you a quick and easy way to view file information. Although the View menu seems readily obvious, do take note, because there are more options here than you might at first think. In the past, you were stuck using icons and wondering what was hiding behind those icons. However, for digital media, the View menu can be very helpful because you can view thumbnails and even use a Filmstrip view, which makes digital picture viewing really helpful.

TOOLBARS

On the View menu, you also see a Toolbars item. If you point to this item, another submenu pops out. This submenu allows you to select the toolbar items you would like to use in the folder. Some of these are enabled by default, but you can enable or disable then by clicking them with your mouse. You have these options:

- **Standard Buttons** – Enabled by default, this option provides you with the standard toolbar buttons, such as Back, Forward, Up one level, Search, and so forth. You need these, so keep this option enabled.
- **Address Bar** – Enabled by default, this gives you the address bar so you can move to different areas of your computer or even the Internet. For example, you could access a folder on your computer by typing the path to the folder (such as C:\My Documents) or an Internet address.

- **Links** – This option, which is enabled by default, gives you a Links button on your toolbar so you can link to resource locations that you commonly access.

Aside from these standard options, you can also lock the toolbars and click Customize. This option opens a Customize Toolbar window, as shown in Figure 8-4, where you can add and remove various toolbar buttons and options. The following steps show you how to create a customized toolbar.

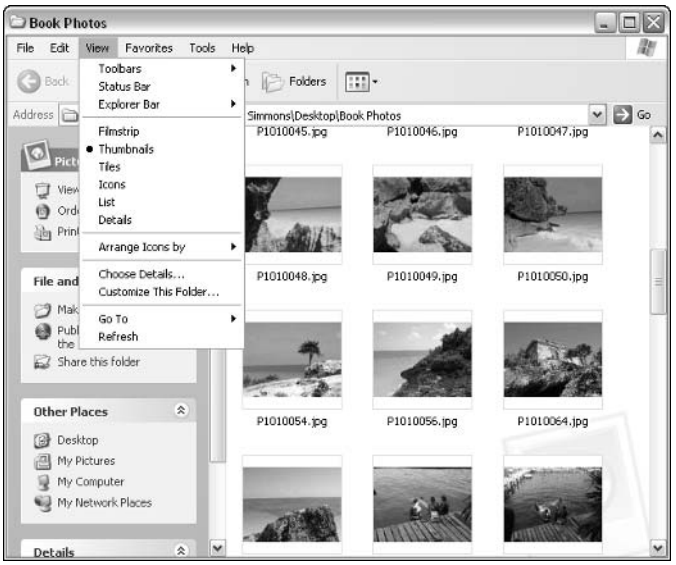

Figure 8-3: View menu.

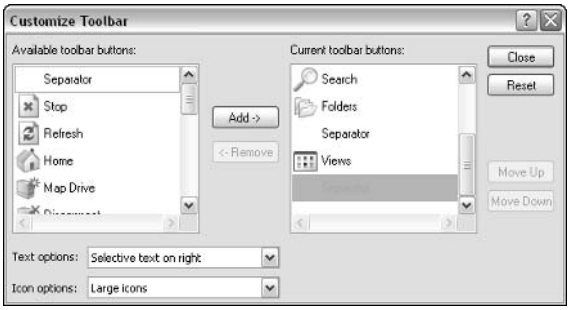

Figure 8-4: View menu.

1. In a desired folder, click View, point to Toolbars, and then click Customize.
2. In the Customize Toolbar window, select any item in the left portion of the window that you want to add to your toolbar, and then click the Add button. Continue this process until you have moved all options that you want.
3. In the right portion of the window, select any item that you do not want to use on your toolbar, and then click Remove. Continue this process until you have removed any options you do not want.
4. In the right portion of the window, select a desired item and use the Move Up or Move Down buttons to adjust the order of the toolbar, as desired.. You can also choose to show text labels, use selective text to the right of the icon, or show no text with the icons at all.
5. Click Close when you are done.

On the Toolbars menu option, notice that you can lock the toolbars. When the toolbars are locked, you can't drag them around or reorganize them on the folder.

STATUS BAR

The Status bar is the small bar that runs along the bottom of your window. It tells you what is going on when you are trying to use or connect to other resources. This bar works just like the Status bar in Internet Explorer, and you can choose to use it or not by clicking Status Bar on the View menu.

EXPLORER BAR

This option has an additional pop-out menu that lists various Explorer items you can select, such as Search, Favorites, and so forth. If you select one of these items, an additional pane appears in the window to provide the Explorer Bar option. For example, if you select the Search option, the window provides a search section. You can experiment with these settings to find ones that are useful to you.

ARRANGE ICONS

The Arrange Icons by option on the View menu lets you arrange icons in a number of ways, including the following:

- By name
- By size

- By type
- When they were last modified (and so on)

Depending on the icons in the folder, you may see additional arrangement options. For example, if you have pictures in the folder, you'll see an option to arrange photos by when the pictures were taken.

CHOOSE DETAILS

The Choose Details option allows you to choose the details that you want displayed. As you can see in Figure 8-5, a simple dialog box appears when you select the option where you can choose the details you want to show, and you can also adjust the order of the details as desired.

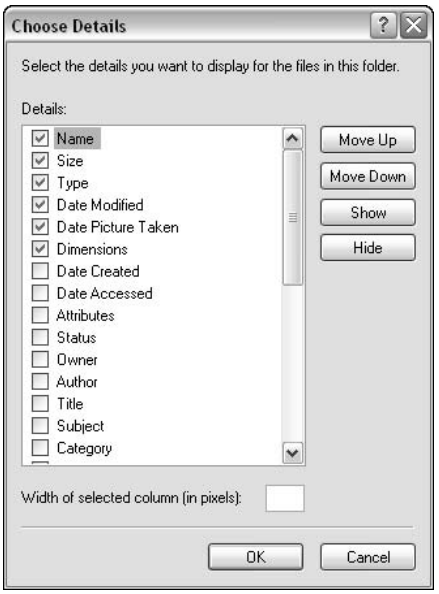

Figure 8-5: Choose Details.

CUSTOMIZE THIS FOLDER

This option opens the folder's properties pages to the Customize tab, as shown in Figure 8-6. You have several options to customize the folder. You can choose a folder template, such as Photo Album, Documents, Pictures, Music, and so forth. Windows XP tries to choose the best template for you based on the kinds of files that are located in the folder. However, you can easily change the template option here.

You also have the option to choose folder pictures and change the folder icon if you like. The folder pictures option simply places pictures on the outside of the folder as a sort of preview to what the folder contains.

Book Photos Properties
General
Sharing
Security
Customize
What kind of folder do you want?
Use this folder type as a template:
Photo Album (best for fewer files)
Also apply this template to all subfolders
Folder pictures
For Thumbnails view, you can put a picture on this folder to remind you of the contents.
Preview:
Choose Picture...
Restore Default
Folder icons
For all views except Thumbnails, you can change the standard "folder" icon to another icon.
Change Icon...
OK
Cancel
Apply

Figure 8-6: Customize options.

Managing File Associations

A commonly frustrating aspect of using files concerns the programs that open them. For example, you may have several JPEG images; those images always open with Windows Picture and Fax Viewer, but you want Internet Explorer to open the JPEG images by default. Different file types have different applications associated with them. However, you can easily change the association so that the file opens with the desired program by following these steps:

1. Right-click the desired file and click Properties.
2. On the General tab, click the Change button.
3. In the Open With dialog box, shown in Figure 8-7, select the program with which you want to open the file. If you want to always open this kind of file with the selected program, click the check box for this option. Click OK.

Open With
Choose the program you want to use to open this file:
File: P1010048.jpg
Programs
Recommended Programs:
Paint
Windows Picture and Fax Viewer
Other Programs:
Acrobat Reader 5.1
Internet Explorer
Microsoft Office Document Imaging
Microsoft Office Excel
Microsoft Office FrontPage
Microsoft Office InfoPath
Microsoft Office Publisher
Always use the selected program to open this kind of file
Browse...
If the program you want is not in the list or on your computer, you can look for the appropriate program on the Web.
OK
Cancel

Figure 8-7: Open With options.

Using File and Folder Encryption

Windows XP Professional also provides built-in encryption so that you can encrypt files and folders. Once files or folders are encrypted, other users cannot read them. For example, if several different people use a Windows XP Professional computer, each user can encrypt his or her own private data so that the other computer users cannot read it. Encryption is seamless and easy to use, and it is a feature of the NT file system (NTFS). You do not have to be aware of any keys or the underlying encryption technology. You simply select to encrypt data, but you can open the data and use it seamlessly without any kind of manual decryption. If another user attempts to access the encrypted data, that user's key will not decrypt the data and it will not be readable.

Before using the Encrypting File System (EFS), you should consider a few issues. First, EFS is a feature of NTFS and only works on NTFS drives. However, encryption and compression are not compatible – you can either encrypt a file or folder or compress it, but you cannot do both. Also, encryption tends to slow access down – using encrypted files is slower than using regular files because Windows XP Professional must encrypt and decrypt files as they are opened or closed.

A new encryption feature in Windows XP enables you to give several users access to the same encrypted file or folder. To give additional users access to the encrypted file or folder, click the Details button in the Advanced dialog box and use the Add/Remove buttons to manage the users who can access the encrypted file or folder.

To use encryption, simply right-click the file or folder that you want to encrypt, click Properties, and then click the Advanced button on the General tab. The Advanced Attributes window, shown in Figure 8-8, gives you an encryption check box that you can use to turn on EFS. Note that you cannot encrypt any files that have the system attribute or any files located in %SystemRoot%. At any point, you can permanently decrypt the file or folder by returning to the Advanced Attributes window and clearing the check box.

Advanced Attributes
Choose the settings you want for this folder
When you apply these changes you will be asked if you want the changes to affect all subfolders and files as well.
Archive and Index attributes
Folder is ready for archiving
For fast searching, allow Indexing Service to index this folder
Compress or Encrypt attributes
Compress contents to save disk space
Encrypt contents to secure data
Details
OK
Cancel

Figure 8-8: Encryption option.

As you might imagine, encryption can be helpful, but several situations can arise that can cause you some problems. For example, what if you need to access your encrypted data over the network from several different workstations? You can do so in a couple of ways. First, if you set up a roaming user profile, the key will be available no matter where you log on. If not, you can copy your key and carry it with you on a floppy disk. Then, you can use the key to open your encrypted data. This export process is rather easy; the following steps show you how.

1. Click Start → Run. Type **MMC** and click OK.
2. In the MMC, click File → Add/Remove Snap-in.
3. In the Add/Remove Snap-in window, click Add. In the snap-in list that appears, click Certificates and click Add.
4. In the Certificates snap-in window, select My User Account and click Finish. Then click Close in the Snap-in window and OK in the Add/Remove Snap-in window.
5. In the MMC, expand Certificates – Current User.
6. Expand the Personal folder, and then select the Certificates folder. In the right pane, select the desired certificate.
7. Click Action → All Tasks → Export, which starts the Export Certificate Wizard.

8. Follow the wizard's simple steps. Make sure that you select to send your private key with your digital certificate. If you are moving to another Windows XP or 2000 system, choose the Enable Strong Encryption option.
9. Choose a password, which you will need to import the certificate in the new location.
10. The wizard saves your certificate and private key to a file (*.pfx, which is a Personal Information Exchange file). You can now copy this file to a floppy disk and move it to a new computer.
11. After you have copied your certificate and private key, you can import the certificate and private key to another computer. Open the Certificates MMC.
12. Open Certificates – Current User. Expand the Personal folder and select the Certificates folder.
13. Click Action → All Tasks → Import. This begins the Import Wizard.
14. Use the Browse option to select the file that you want to import and complete the wizard steps. You will need to provide the password you assigned to the file when you were exporting.

Another issue that can occur regarding encryption is the recovery of encrypted data. For example, say a user who shares your computer encrypts his or her data, but the recovery key is lost. Or, in the case of a company computer, the user leaves the company without decrypting the data. Aside from using the private key to encrypt/decrypt data, Windows XP Professional also provides Recovery Agents for this purpose. You can assign Recovery Agents so that data can be recovered in the event that the user's private key is lost or corrupted, or if the user abandons the data. This prevents data from being hopelessly lost in encryption. However, the agent can only decrypt data – not reencrypt it.

To configure a Recovery Agent, you must be logged on to Windows XP Professional as an Administrator, and you need to know the location of the certificate of the person who will become the Recovery Agent. If you are part of a domain, a network administrator will need to assist in this process because certificates are most often stored in the Active Directory in Windows domain networks. Follow these steps to configure a Recovery Agent.

1. Click Start → Run. Type MMC and click OK.
2. In the console window, click File → Add/Remove Snap-in.
3. In the snap-in window, click Add. In the Add Standalone Snap-in window, click Group Policy and click Add.
4. In the Group Policy Object window, leave the Local Computer option selected and click Finish.

5. Click Close in the Add Standalone Snap-in window and OK in the Snap-in window. You now see the Local Computer Policy in the MMC. Expand Local Computer Policy → Computer Configuration → Windows Settings → Security Settings → Public Key Policies → Encrypting File System.
6. Right-click the Encrypting File System folder and click Add Data Recovery Agent. This starts the Add Recovery Agent Wizard. Click Next on the Welcome screen.
7. Using the wizard, locate the desired user certificate. You can select the certificate from the Active Directory. If the certificate is not located in the Active Directory, you need to choose a local *.cer file. The certificate must be saved as a *.cer file.

Using File and Folder Compression

There are two ways to use compression in Windows XP. First, you can use NTFS file and folder compression, or you can use standard folder compression, which utilizes the WinZip technology. The following two sections explore these options.

Using NTFS Compression

Using NTFS compression, you can compress individual files, folders, and even drives on your local computer. Naturally, NTFS compression only works on drives that are formatted with NTFS (see Chapter 7 to learn more about the NTFS file system and how to convert drives to NTFS).

NTFS compression is fast and easy, and it gives you a lot of compression options. All compressed items remain in a compressed state unless you move the contents to a file allocation table (FAT) volume. FAT does not support NTFS compression, so compression is lost when the file or folder is moved. If you move the files to a different NTFS volume, the files inherit the state of the destination folder. If you want to work with a compressed file, Windows XP automatically decompresses it for you while the file is in use. When you close the file, Windows XP automatically compresses the file again. If you move or copy a file into a compressed folder, it is compressed automatically. If you move a file from a different NTFS drive to a compressed folder, it is also compressed. However, if you move a file from the same NTFS drive into a compressed folder, it retains its original state, either compressed or decompressed.

You cannot encrypt an NTFS-compressed file nor can you compress a file that has been encrypted.

As a general rule, NTFS compression reduces drive, file, and folder size by about 50 percent. Applications are reduced by about 30 percent. The following steps show you how to compress a drive, or a folder or file:

1. Click Start → My Computer.
2. In My Computer, right-click the desired NTFS drive and click Properties.
3. On the General tab, shown in Figure 8-9, click the Compress drive to save disk space check box to compress the entire drive. Click OK.

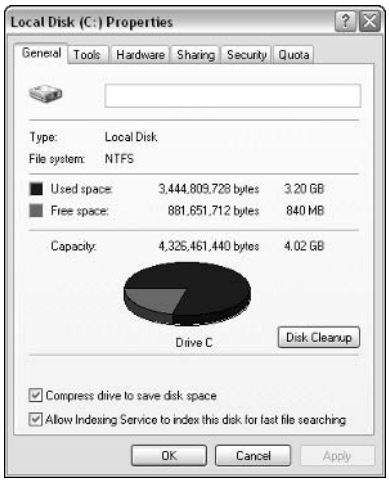

Figure 8-9: Compress an entire NTFS drive.

4. To compress a folder or specific file, browse to the desired file or folder. Remember that the file or folder has to reside on an NTFS drive for compression to be available.
5. Right-click the desired file or folder and click Properties.
6. On the General tab, click the Advanced button.
7. In the Advanced Attributes window, click the Compress contents to save disk space check box and click OK.

If you prefer to use the command line, you can access Compact.exe to manage compressed files and volumes in Windows XP. Using Compact.exe, you can compress, decompress, and view the compression attributes of a folder, file, or drive. The syntax for Compact.exe is as follows:

```
Compact.exe [/c] [/u] [/s[:dir]] [/a] [/i] [/f] [/q] [filename
[...]]
```

An explanation of the switches appearing in the Compact.exe syntax is provided in Table 8-1.

TABLE 8-1 SWITCHES

Switch	Explanation
C	Compresses the specified file
U	Decompresses the specified file
S	Performs the specified operation on the files in the given folder and all subfolders
A	Displays file with hidden or system attributes
I	Continues performing the specified operation even after errors have occurred
F	Forces the compress operation on all specified files, including currently compressed files
Q	Reports only the most essential information
Filename	Specifies a pattern, file, or folder

Compressed (Zipped) Folders

Folder compression, which is built on WinZip technology, gives you a quick and easy way to copy files to a compressed folder, which can then be e-mailed or stored. Windows XP also contains a built-in compression feature so that you can compress folders on either FAT or NTFS partitions. At first glance, you might not think there is a need for zipped folders when NTFS compression is available, but there are several advantages and issues to keep in mind.

Compressed folders can reside on either NTFS or FAT volumes, unlike NTFS compression, which only works on NTFS volumes. Files that reside in a compressed folder can be directly opened without unzipping them, and some applications can also run in a zipped state. Zipped folders can be moved to any drive or folder on your computer, another computer, the Internet, or be sent via e-mail and remain in their compressed state. Files cannot be individually compressed using the zip feature. You must place them in a compressed folder to compress the files. Also, compressed folders can be password protected.

Changing the Color of Compressed Items

If you want to be able to easily keep track of what items are compressed and what items are not compressed, Windows XP gives you an option to make compressed items appear in a different color. This setting also applies to encrypted files and folders. To configure color for compressed folders, just follow these steps:

1. Open the Control Panel and double-click Folder Options.
2. Click the View tab.
3. Scroll and locate the Show encrypted or compressed NTFS files in color check box. Select the check box, and then click OK.

To compress a folder, simply right-click the folder and click Send To→ Compressed Folder. This creates the zipped folder with all of the original folder's contents compressed, but the original folder remains. In other words, you'll see your original folder and a copied, compressed folder of the same contents. If you want to create an empty compressed folder to which you can copy items, simply click File→New→Compressed Folder from within the desired folder or Windows Explorer. If you want to create the new compressed folder on your desktop, right-click an empty area of the desktop and click New→Compressed folder. Any items you store in the folder will be compressed. If you want to decompress a folder, right-click the compressed folder and click Extract All. A wizard appears to help you decompress the folder.

Offline Files and Folders

Offline Files is a networking feature that uses a computer as a server to store a particular network file. Other users can then access that file from the network and use the file as if the file were stored locally. This kind of configuration works well in environments where file collaboration takes place, or where users need to regularly access a collection of documents that are centralized on a server. Using Offline Files, the offline file is downloaded and stored locally on the user's computer. The user can then make changes to the file, as needed, and those changes can be synchronized with a server. Offline Files allows several people to make changes to a file without maintaining multiple copies of the same file. The server recognizes the new changes and incorporates them. Virtually any type of file, from documents to Web pages, can be made available offline. Windows XP Professional makes setting up offline files easy using a wizard tool that helps the user connect with the desired network file. The following steps show you how:

1. Log on as an administrator.
2. Open the Control Panel and open Folder Options. Click the Offline Files tab. If you see a message telling you that Fast User Switching is enabled, you'll need to change the option in User Accounts so that Fast User Switching is disabled. Offline Files are not compatible with Fast User Switching.
3. On the Offline Files tab (see Figure 8-10), click the Enable Offline Files check box. You can then set some other offline file options, including the following:
   - Synchronize all offline files when logging on
   - Synchronize all offline files before logging off
   - Display a reminder every *X* minutes
   - Create an Offline Files shortcut on the desktop
   - Encrypt offline files to secure data

Folder Options
General
View
File Types
Offline Files
Use Offline Files to work with files and programs stored on the network even when you are not connected.
Enable Offline Files
Synchronize all offline files when logging on
Synchronize all offline files before logging off
Display a reminder every:
60
minutes.
Create an Offline Files shortcut on the desktop
Encrypt offline files to secure data
Amount of disk space to use for temporary offline files:
413 MB (10% of drive)
Delete Files...
View Files
Advanced
OK
Cancel
Apply

Figure 8-10: Offline Files tab.

4. By default, offline files use 10 percent of your hard drive's disk space for storage. You can increase or decrease this amount, as desired, by moving the slider bar.
5. Using the Delete Files button, you can delete previously stored offline files. Using the View Files button, you can view currently stored offline files.

6. If you click the Advanced button, you see an Advanced Settings window. This option enables you to be notified when a network connection has been lost so that you can begin working offline. You also have the radio button option to never go offline. You can also generate an exception list. Make any desired configuration changes and click OK.
7. Now that Offline Files is enabled, you can choose what file or folder you want to make available offline. Using My Network Places or any desired window, browse to the network resource, right-click it, and click Make Available Offline.
8. The Offline Files Wizard appears. Click Next on the Welcome screen.
9. The Synchronization window appears. If you want to automatically synchronize when you log off and log on, leave the check box selected and click Next. If not, clear the check box and click Next.
10. The final window, shown in Figure 8-11, allows you to enable reminders and create a shortcut to the desktop. You can enable these if you like. Click Finish.

Offline Files Wizard
While you are offline, a message appears periodically to remind you that you are not connected to the network.
Enable reminders
Whether you are working online or offline, you can access your Offline Files in the same network folders or in the Offline Files folder.
Create a shortcut to the Offline Files folder on my desktop
< Back
Finish
Cancel

Figure 8-11: Enable Reminders option.

11. The files are copied to your computer.

After you've set up offline files, simply use the file as desired. Depending on your settings, the file is automatically synchronized with the original file. You can manually enforce synchronization at any time by right-clicking the file or folder and clicking Synchronize. You can further manage offline files by accessing the Synchronization tool. The following steps show you how:

1. Log on as an administrator.
2. Click Start → All Programs → Accessories → Synchronization.

3. The Items to Synchronize window appears, as shown in Figure 8-12. Any current offline files or folders appear here. You can select any items that you want to manually synchronize and click the Synchronize button.

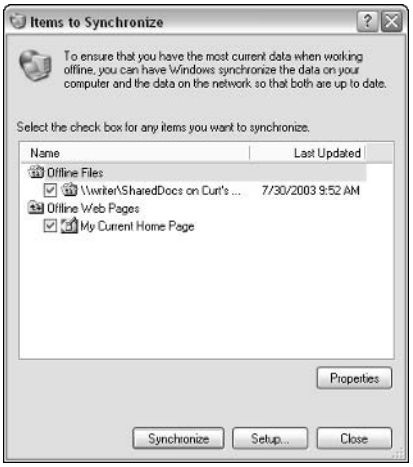
Items to Synchronize
To ensure that you have the most current data when working offline, you can have Windows synchronize the data on your computer and the data on the network so that both are up to date.
Select the check box for any items you want to synchronize.
Name
Last Updated
Offline Files
\\writer\SharedDocs on Curt's ...
7/30/2003 9:52 AM
Offline Web Pages
My Current Home Page
Properties
Synchronize
Setup...
Close

Figure 8-12: Synchronization tool.

4. You can also click the Setup button to change the synchronization settings, which you can change at any time (see Figure 8-13). You have a Logon/Logoff tab, On Idle tab, and a Scheduled tab. These tabs are self-explanatory, and you can use them to determine the way synchronization occurs and when synchronization occurs. Make any desired changes and click OK.

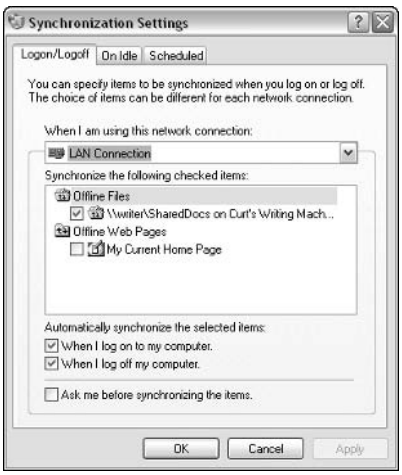
Synchronization Settings
Logon/Logoff
On Idle
Scheduled
You can specify items to be synchronized when you log on or log off. The choice of items can be different for each network connection.
When I am using this network connection:
LAN Connection
Synchronize the following checked items:
Offline Files
\\writer\SharedDocs on Curt's Writing Mach...
Offline Web Pages
My Current Home Page
Automatically synchronize the selected items:
When I log on to my computer.
When I log off my computer.
Ask me before synchronizing the items.
OK
Cancel
Apply

Figure 8-13: Synchronization Settings.

Chapter 9

Working with the Registry

IN THIS CHAPTER

- Exploring the Registry
- Editing the Registry

THE REGISTRY IS ESSENTIALLY a large database of information Windows XP uses to manage hardware, programs, settings, and just about anything else you want to do with Windows XP. The Registry stores information, then Windows XP uses the Registry to determine how it should respond to different requests, input, and application and hardware management. When you work with Windows XP, the items that you configure are stored in the Registry.

You can directly edit the Registry and make changes to it. Although not a recommended strategy by Microsoft, the Registry continues to be an effective way to fix problems and change features of Windows XP that you are having trouble with. However, when you think of editing the Registry, it is important to keep in mind that the Registry is also a dangerous tool. Changes made to the Registry are effective immediately, and incorrect changes can cripple your operating system and leave it unbootable. So, Registry editing is a useful skill, but one that requires respect and care.

With the warning out of the way, this chapter explores the Registry and shows you how to manage it through Windows XP's built-in Registry Editor.

Understanding the Registry

The Registry has been around since the days of Windows 3.*x*. In Windows XP, it continues to be an effective way to manage configuration data, and each time you configure your system, changes are written to the Registry so that Windows XP can use your configuration data to make the system run as you wish.

In the days of 16-bit Windows, configuration information was kept in .INI files. The operating systems used WIN.INI and SYSTEM.INI to hold specific information. Third-party software often added their settings to these files, and they often created their own .INI files, either in the Windows directory or in the application's home directory. If you wanted to back up your vital configuration information, the settings were always spread all over your computer's hard disk in many different files. The Registry was Microsoft's attempt to bring all this information together into a single place.

Over the years, the Registry has become quite large, and the primary reasons for its expanding size are more configuration options in Windows and more applications that write directly to the Registry. Every time you use the Windows XP setup program, install additional hardware, or install 32-bit Windows software, data gets stored in the Registry. However, some programs still use .INI files to save their settings. Windows XP supports this practice to maintain backward-compatibility with older applications.

Getting to Know the Registry's Structure

The Registry is structured in a top-down fashion, similar to how folders on your hard drive are organized. The Registry consists of five subtrees, each of which is devoted to holding a certain kind of information. Each subtree begins with the word HKEY (see Table 9-1). HKEY denotes a standard key for software developers who need to write programs that can write settings to the correct Registry subtree.

TABLE 9-1 WINDOWS XP REGISTRY SUBTREES

Root Key Name	Description
HKEY_CLASSES_ROOT	Contains the associations between applications and file types, OLE Registry information, and file-class associations.
HKEY_CURRENT_USER	Contains the user profile for the individual who is currently logged on. It also contains environment variables, desktop settings, application preferences, network connections, and printer information.
HKEY_LOCAL_MACHINE	Contains information about the local computer system. Settings for hardware and operating system features such as bus type, system, memory, device drivers, and startup control data are located here.

Root Key Name	Description
HKEY_USERS	Contains all the actively loaded user profiles. This includes the HKEY_CURRENT_USER and the default Admins profile.
HKEY_CURRENT_CONFIG	Contains the configuration information for the current hardware profile.

Keys

Each subtree within the Registry holds individual keys. A key might contain subkeys, or it might actually hold data. Subkeys can, in turn, hold additional subkeys. A subkey might only have one value entry, or it might have many. A Registry key's value entry has three parts:

- The name of the subkey
- The subkey's data type
- The subkey's actual value

There are five data types, as shown in Table 9-2

TABLE 9-2 WINDOWS 2000 REGISTRY DATA TYPES

Data Types	Description
REG_BINARY	Raw binary data that will typically be displayed in hexadecimal notation, making it difficult for you to read.
REG_DWORD	A four-byte-long number that will be displayed in binary, hexadecimal, or decimal format. This data type is often used for device drivers and services.
REG_EXPAND_SZ	An expandable data string that holds a variable that will be replaced when it is called by an application. It will often look something like %systemroot%, which will be replaced by the actual folder name containing your Windows XP files.
REG_MUTLI_SZ	A multiple string that usually holds a list of values, which are in a human-readable form, rather than being in binary or hexadecimal notation. The values are separated by a NULL character.
REG_SZ	A text string in a human-readable form.

Hives

Unlike Windows 95, Windows 98, and Windows NT 3.x, which stored the Registry in two files called System.dat and User.dat, the Windows XP Registry is patterned after the Windows NT 4.0 and 2000 Registry. When the Registry has been saved to disk, it is actually split into many additional parts, which are referred to as *hives*. According to Microsoft, a hive is a "discrete body of keys, subkeys, and values rooted at the top of the Registry hierarchy." Actually, not all of the Registry is stored in hives. Hives are those Registry keys that are permanent components of the Registry, not the dynamic parts, such as HKEY_LOCAL_MACHINE\Hardware, which is built only when Windows XP boots. Most of the hives are stored in the C:\windows\system32\config folder, as shown in Figure 9-1 and listed in Table 9-3.

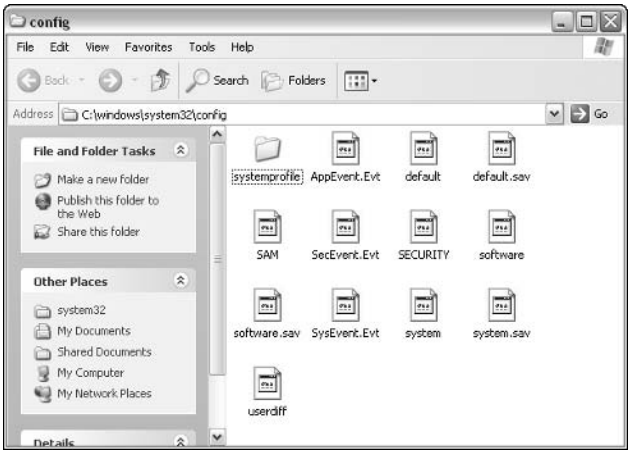

Figure 9-1: You can view hives in the config folder.

TABLE 9-3 REGISTRY HIVES IN \SYSTEM32\CONFIG

Registry Segment	Related Files
HKEY_CURRENT_CONFIG	system, system.alt, system.log, system.sav
HKEY_LOCAL_MACHINE\SAM	sam, sam.log, sam.sav
HKEY_LOCAL_MACHINE\Security	security, security.log, security.sav
HKEY_LOCAL_MACHINE\Software	software, software.log, software.sav
HKEY_LOCAL_MACHINE\System	system, system.alt, system.log, system.sav
HKEY_USERS\.Default	default, default.log, default.sav
HKEY_CURRENT_USER	ntuser.dat, ntuser.log

In addition to the files listed in Table 9-3, you will also find userdiff and userdiff.log files in system32\config. Although these are not associated with a particular part of the Registry, they are used when you upgrade your operating system (for example, from Windows 2000 or Me to XP).

As you can see from Table 9-3, each hive might have either three or four files associated with it. If the file has no extension, it is a copy of the hive. If the file has a .log extension, it is a transaction log showing changes to keys and value entries in the hive. The Software, SAM, Security, System, and Default hives also have .sav files. These are copies of the hive created at the end of the text mode stage of the Windows XP setup. Therefore, they should have file dates corresponding to the date you installed or upgraded Windows 2000.

One hive — HKEY_LOCAL_MACHINE\System — plays such a critical role that an extra backup is created with the filename System.alt. (The other hives do not have .alt files.) If you want to see a list of files that go with each hive, you can explore in a Registry key at HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\hivelist. You'll learn how to navigate to this Registry key using the Registry Editor tool in the upcoming sections.

Restoring the Registry

Although it may appear that the most important task you can learn is to edit the Registry, the most important aspect of working with the Registry is actually restoring it should you boot your computer and receive an error message telling you that the Registry has been corrupted. Fortunately, each time Windows XP successfully starts, it backs up the Registry. In the event that you cannot boot Windows due to a corrupted Registry, you can use the last known good version of the Registry from backup. This provides you with a record of your computer's configuration the last time it started successfully. You can also back up the Registry manually using the Windows Backup tool and backing up System State Data. The following steps show you how to restore the Registry using the last known good version.

See Chapter 17 to learn more about System State Data and Windows Backup.

Any changes that you have made since the last successful boot will not appear once you use the last known good configuration to boot your computer. Because the last known good option boots from the previous Registry's backup, any changes since that last boot will not be recorded in the backup file.

1. If your computer will not boot, and you see the error message that the Registry is corrupted, shut down your computer.
2. Wait about 10 seconds, and then turn the power back on.
3. When the computer starts, hold down the F8 key.
4. The Safe Mode menu appears. Use your arrow keys to move your cursor down and select the following choice: Last Known Good Configuration. Press the Enter key.
5. Follow the remaining instructions on your screen.

Using the Registry Editor

Windows XP contains a Registry editor called RegEdit. RegEdit can help you find a configuration setting, troubleshoot problems, and make technical changes in Windows XP, as well as in applications that use the Registry to store preferences. I reiterate the big warning here—*editing the Registry is serious business*. Changes you make go into effect immediately, and if you make a mistake, there is no undo option, so always edit the Registry as a last resort to problem solving. Using Control Panel applets and other Windows properties pages to manage Windows XP and fix problems is best. However, RegEdit can be a valuable and effective tool.

If you have used previous versions of Windows, you may wonder what has happened to Regedt32. In the past, Windows operating systems provided RegEdit and Regedt32, but in the new version of the Registry Editor included with Windows, the features of Regedt32 have been incorporated to create a single Registry Editor.

The RegEdit tool is a bit hidden in Windows XP, by design. However, you can easily access it by typing RegEdit in the Run dialog box on the Start menu and clicking OK. As you can see in Figure 9-2, the Registry Editor looks like any other MMC console. You see the Registry keys in the left pane, and whatever you select appears in the right pane.

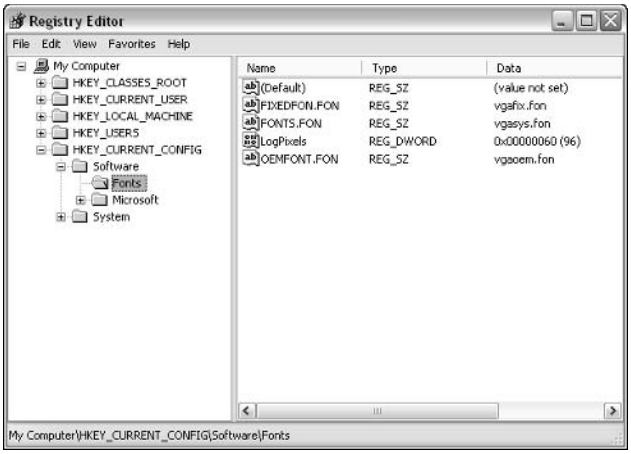

Figure 9-2: Registry Editor.

For each value entry that appears in the right console pane, you see three parts:

- The name, which generally defines the value contained by the key
- Data types, which show you the kind of data that is allowed in the value
- Data, which gives you the value of the entry

As you can imagine, each key contains a lot of values, but you can use a quick little trick to expand an entire key. Just select the key in the left pane, then hold down the ALT key on your keyboard, and press the asterisk (*) key on the number keypad. This action expands the entire key. To collapse it, just double-click the key. To make a key return to the default action of only expanding one subcategory at a time, just collapse the key, then press F5 on your keyboard.

Exploring the Subtrees

As you learned earlier in this chapter, the Registry is made up of distinct subtrees, all of which are used to classify and hold information about different system components, applications, and so forth. Using RegEdit, you can take a look at each subtree and explore the content found in that subtree. The following sections give you a brief overview of each subtree.

HKEY_CLASSES_ROOT

The HKEY_CLASSES_ROOT tree holds the information that relates file types to applications, as well as data types and COM objects, as shown in Figure 9-3. Given the large number of associations that a computer might have, this subtree is usually quite large when it is first expanded, and it will grow as you install more software on your computer. This subtree is also where COM object information is stored, which tells Windows XP how to find and run software components.

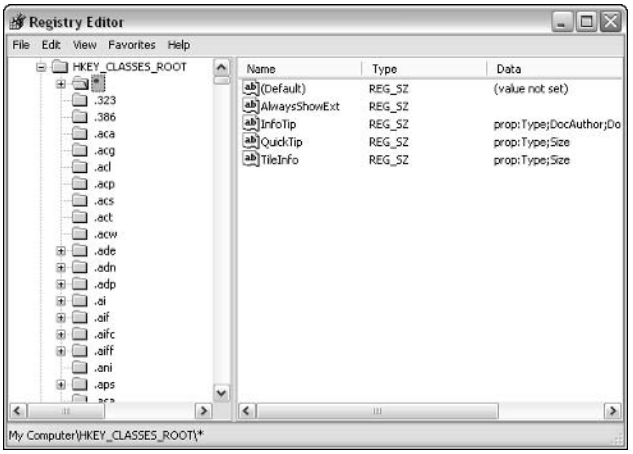

Figure 9-3: HKEY_CLASSES_ROOT.

HKEY_CURRENT_USER

The HKEY_CURRENT_USER subtree holds the information about the user profile for the person who is currently logged on to the computer. Most of the user interface settings that you set through the Control Panel are stored here, as shown in Figure 9-4. As you explore the Registry, you may note that some settings you find in HKEY_CURRENT_USER are also found in HKEY_LOCAL_MACHINE. However, HKEY_CURRENT_USER settings are always given priority over HKEY_LOCAL_MACHINE settings.

When a user logs on to a Windows XP computer, his or her user profile is taken from the HKEY_USERS key and copied into the CURRENT_USER key. If no user profile exists for the user who is logging on to the computer (for example, a guest or a new user), Windows XP uses the Default User profile. Table 9-4 explains the subkeys you see.

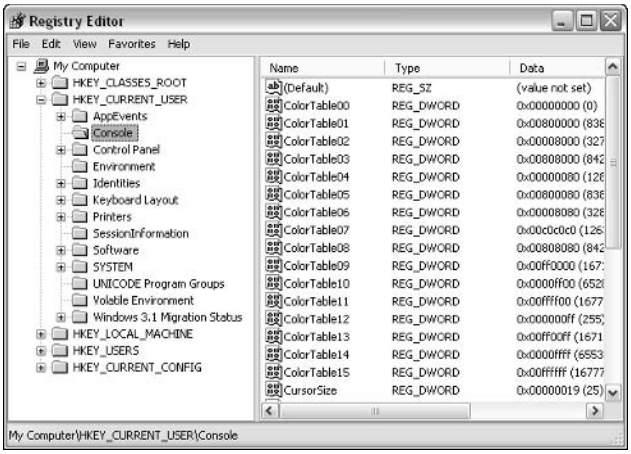

Figure 9-4: HKEY_CURRENT_USER.

TABLE 9-4 HKEY_CURRENT_USER SUBKEYS

Subkey	Information the Key Contains
AppEvents	Application events that you assign to certain .WAV sound files using the Sounds and Multimedia applet in the Control Panel.
Console	Sets the window size, along with options for any console tools.
Control Panel	Many of the options that you can choose using the Mouse, Keyboard, and Display Options applets in the Control Panel are stored in this subkey.
Environment	Environment settings that are set using the System applet in the Control Panel are stored in this subkey.
Identities	Multiple identities in Outlook Express 5 are stored in this subkey. Under each subkey, you can find the actual username belonging to the identity.
Keyboard Layout	Keyboard language information relating to the Input Locales you choose in the Regional Options applet in the Control Panel are stored in this subkey.

Continued

TABLE 9-4 HKEY_CURRENT_USER SUBKEYS *(Continued)*

Subkey	Information the Key Contains
Printers	Printer information is stored in this subkey. Information about each physically installed printer can be found here, but no information is contained in this subkey for software-based devices such as fax modems.
SessionInformation	Contains data relating to the current user's Windows session.
Software	Application-specific settings are stored in this subkey. These entries are usually created when you install software. Much of the data here will have a similar structure to the data in the HKEY_LOCAL_MACHINE\Software subkey.
System	This subkey contains information about system settings.
Unicode Program Group	Starting with Windows NT 4.0, this key is no longer used. It is left in place for compatibility reasons.

HKEY_LOCAL_MACHINE

The HKEY_LOCAL_MACHINE key contains the configuration information for your computer. Some of the data in this key is created each time the computer boots up. The data in this key cannot be edited directly, even using the Registry Editor. Five subkeys are located in HKEY_LOCAL_MACHINE, as shown in Figure 9-5.

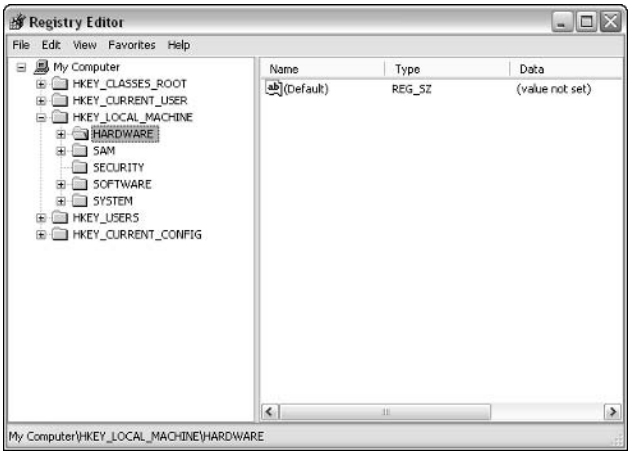

Figure 9-5: HKEY_LOCAL_MACHINE.

HARDWARE

The HKEY_LOCAL_MACHINE\HARDWARE subkey holds the dynamic hardware configuration data for the computer. This subkey is refreshed each time the computer boots up, and the data is then discarded when the system shuts down (it is not stored in a hive file).

SAM AND SECURITY KEYS

The Windows XP Security Account Manager (SAM) and Security keys handle security information, and they play a big role when a Windows XP computer is connected to a Windows network server using the Active Directory services.

SOFTWARE

The data contained in the HKEY_LOCAL_MACHINE\SOFTWARE subkey is configuration information about the software installed on the computer. The subkeys under this key will differ depending on what applications have been installed, but there will always be common subkeys among computers.

Note that toward the end of the Microsoft subkey, you will find a subkey called HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion, as shown in Figure 9-6. This isn't an error, even though you are a long way from Windows NT with Windows XP. The Windows NT name is left due to similar architecture between the Windows NT system and Windows 2000 and XP. This subkey holds information about Windows XP services, as well as information about the installed version of Windows XP.

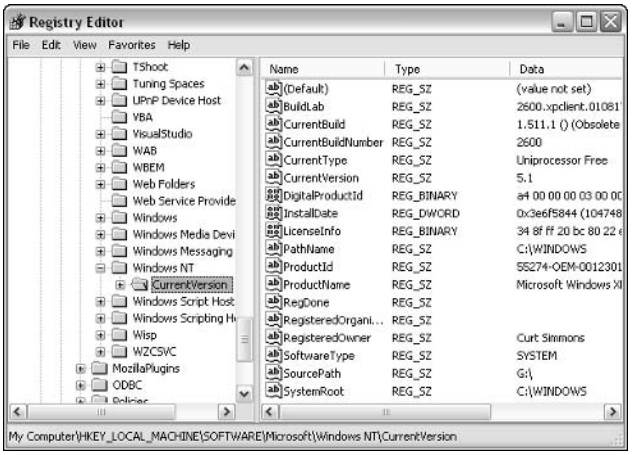

Figure 9-6: The CurrentVersion gives you information about your computer configuration.

SYSTEM

The HKEY_LOCAL_MACHINE\SYSTEM subkey holds all the data that Windows needs but that can't be initialized during the startup process. Instead, the information

is stored here in the System subkey. Recognizing the importance of this information, this is the one subkey that also has an extra backup file called System.alt. This data is crucial to starting the system; if you make changes with unintended consequences, you can back your changes out, because Windows XP automatically keeps a safe backup of this information.

The startup data is kept together in subkeys called *Control Sets*. While there can be up to four control sets – which would be labeled ControlSet001, ControlSet002, and so on – there are usually only two: the current control set plus one backup. This backup is done automatically by the system and normally requires no user intervention. Information on the various control sets is tracked in the HKEY_LOCAL_MACHINE\SYSTEM\Select subkey, as shown in Figure 9-7. Four value entries in this subkey track the following:

- **Default** – This is the number of the control set that will be used at the next system startup, unless the LastKnownGood configuration is manually selected.
- **Current** – This is the control set that started the system for the current session.
- **Failed** – This control set was replaced when the LastKnownGood control set was used to start the system.
- **LastKnownGood** – This set is an unmodified copy of the last set that was used to successfully start the system.

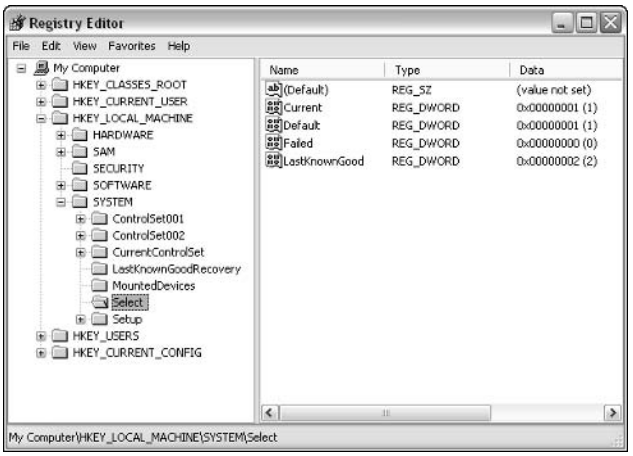

Figure 9-7: The HKEY_LOCAL_MACHINE\SYSTEM\Select subkey keeps track of the control set.

If you had a problem starting your computer, the presence of both the bad and the good control set might give you a clue as to what problem occurred. You can view the failed set with the Registry Editor, and then compare it to the functional control set. Make sure, however, that you do not tamper with the LastKnownGood control set. Doing so may cripple your LastKnownGood configuration, preventing you from a system recovery if needed.

HKEY_USERS

The HKEY_USERS subtree usually holds two user profiles:

- The first profile is for the user who is actually logged on to the computer. The key name for the active user shows the Security ID for that user.
- The second profile is the default user profile, located in the subkey HKEY_USERS\.DEFAULT, which is used when no one is logged on to the computer (for example, when the Login prompt is displayed on the desktop). The structure of the .DEFAULT subkey is similar to the structure of the HKEY_CURRENT_USER section in the Registry.

HKEY_CURRENT_CONFIG

The HKEY_CURRENT_CONFIG key was added to the Windows NT 4.0 Registry — and is also contained in the Windows XP Registry and the Windows 2000 Registry — to achieve compatibility with the Windows 95 Registry. It duplicates the information in the HKEY_LOCAL_MACHINE\System\CurrentControlSet\Hardware Profiles\Current subkey, which is the current hardware profile data. According to Microsoft, programs written for Windows 95 (which may look for information in these keys) will also be able to run under Windows XP/2000.

Using the Registry Editor

As you learned in earlier sections of this chapter, the Registry Editor is your Windows XP tool that enables you to make changes to Registry values. Once again, keep in mind that if at all possible, you should make configuration changes using Control Panel applets and other desktop tools before using Registry Editor.

To learn how to edit the Registry, it helps to get to a location that has some useful keys, constants, and values. Editing the Registry consists of adding or deleting keys, adding new constants and their values to be associated with the keys, and modifying those constants and their values. The trick is knowing what keys, constants, and values to add, rename, or delete. The following steps give you an example of editing the desktop.

1. Click the plus sign (+) to the left of HKEY_CURRENT_USER. Click the plus sign to the left of the Control Panel folder icon, and then the one next to the Desktop folder icon.
2. Highlight the WindowMetrics name next to its folder icon. Notice that the right pane is now filled with constant names (Name) and values (Data), as shown in Figure 9-8.

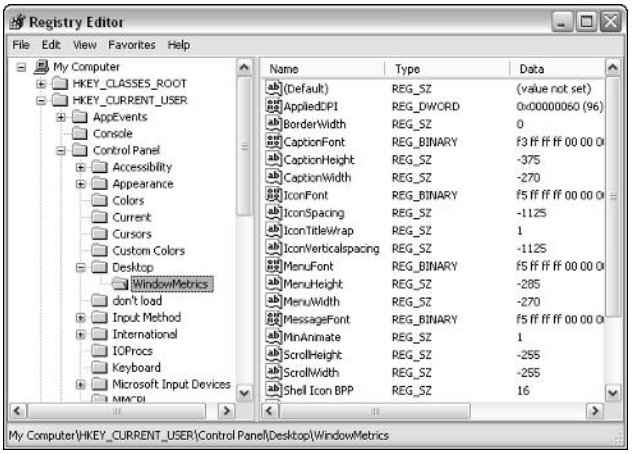

Figure 9-8: Select the WindowMetrics folder.

3. Right-click in the Registry Editor's right pane (but not on a constant name or value). A New button, as shown in Figure 9-9, appears. Point to the New button, and a menu appears. You can choose to create any of the following:
   - A key
   - A string value
   - A binary value
   - A DWORD value

   The key and/or any of the constants will be attached to the WindowMetrics key.
4. Right-click the Desktop key in the Registry Editor's left pane. The context menu will give you the choice of doing the following:
   - Collapsing this expanded branch of the Registry
   - Creating a new key, string value, or binary value
   - Finding a text or numerical string in the local branch
   - Deleting or renaming the key

It is not a good idea to delete or rename a key unless you know exactly what you are doing. Adding a new key or value (actually, a constant that has a value, which the Registry Editor refers to as *Data*) might change the way Windows operates, but it won't do any damage.

5. Right-click a constant in the Name column in the right pane of the Registry Editor. A Context menu appears, allowing you to modify the constant's value, delete the constant and its value, or rename the constant.

6. The Edit menu provides similar choices to those that appear on the Context menu when you right-click a key or a constant. The Edit menu changes depending on whether you have highlighted a key or a constant. You can't highlight a value (or Data).

7. If you want to edit a string, just double-click it in the right console pane and you'll see the Edit String dialog box, as shown in Figure 9-10. As you can see in the figure, the PowerOffActive value is set to 0, meaning it is not turned on. You can change this to a 1 to activate it. Depending on the string, you might have different editable value options available.

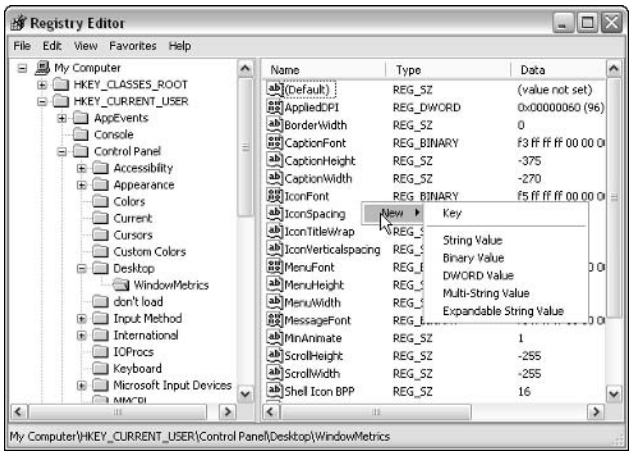

Figure 9-9: Insert a new key or value in the Registry.

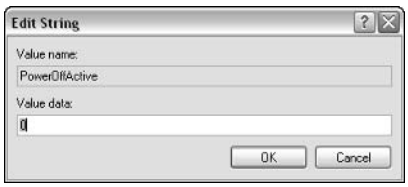

Figure 9-10: Insert a new key or value in the Registry.

Editing the Registry with reg Files

You can also edit and update a Registry using reg files. Most often, you edit the Registry by changing settings in dialog boxes, without being directly aware that the changes you make are being recorded in the Registry. Another way that you can switch between Registry settings is to create and use reg files.

1. Choose one of the settings you want in the Registry.
2. Export the small branch of the Registry that contains this setting to a text file and save the file with the .reg extension.
3. Use the reg file and import it to another Registry for updating.
4. If you now place a shortcut to the reg file on your desktop, you can quickly switch back and forth between the settings by clicking the file instead of by interacting with a dialog box.

Exporting and Importing Registry Files

You can export a branch of the Registry or the entire Registry to a text file that can be opened in an editor such as NotePad or WordPad. You might want to do this so that you could search for values or perform some involved editing (to take advantage of the advanced editing tools in WordPad, such as Search and Replace), or to import some of the exported data into another Registry file.

1. Click Start → Run, and then type **regedit** in the Open text box. Press Enter or click OK.
2. Navigate to the branch of the Registry that you wish to export (for example, select HKEY_CURRENT_USER\Control Panel\Appearance\Schemes key).
3. Click File → Export Registry File. This opens the Export dialog box.
4. Unless you want to export the entire Registry, choose Selected branch in the Export range section in the lower portion of the dialog box.
5. Choose the subfolder to which you want to save the file, and then provide a name for your file, such as Schemes.
6. If you want to be able to import this data back into this or some other Registry file, use the default file extension of .reg.
7. Click Save, which will save the file and then close the dialog box.

After you have exported the Registry branch, any text editor, such as NotePad or WordPad, can read it. You can start WordPad, and then use its File, Open command to load the file. You also can find the file in Windows Explorer, right-click the file, and click the Open With option on the context menu to select a program with which to open the file, such as WordPad or NotePad. You do not want to click (or double-click) the .reg file, nor do you want to select the Open command from the context menu. Doing so will cause the file to be merged back into the Registry.

Chapter 10

Working with the Microsoft Management Console

IN THIS CHAPTER

- Using the MMC
- Creating custom MMCs
- Creating Taskpad views

THE MICROSOFT MANAGEMENT CONSOLE (MMC), a GUI interface, first came onto the scene with a few Microsoft BackOffice products such as Internet Information Server, Proxy Server, and Systems Management Server in the days of Windows NT. The MMC provides a streamlined way to use a variety of administrative tools, and it is now fully integrated with Windows 2000 and Windows XP operating systems. The MMC gives you a quick and easy way to access certain tools and even create your own custom consoles. In this chapter, you'll learn how to work with the MMC and how to customize it.

Microsoft Management Console

The MMC is a stripped-down GUI interface that looks similar to an Explorer window. The MMC is just a simple console that enables you to control various administrative tools. Administrative tools are called *snap-ins*—they snap into the MMC. Without any snap-ins, the MMC has no functionality. In other words, the MMC's purpose is to enable you to use administrative tools. The MMC does not do anything on its own. The MMC provides you with the controls to manage the snap-in. I like to think of the MMC and snap-ins as a car and a motor. The inside of the car is the MMC—you have a steering wheel, accelerator, brakes, gearshift, and so forth. The snap-in is the car's motor. Without the motor, the steering wheel, brakes, and so on do not have any purpose. Those components enable you to control the car's motor; the MMC enables you to control and use snap-ins.

All of the standard tools in Windows XP are MMC snap-ins. This includes Computer Management, Event Viewer, Performance console, and so forth. When you launch one of these tools, the MMC is opened and the appropriate snap-in is loaded. For example, if you click Start → Control Panel → Administrative Tools → Computer Management, the MMC opens and the Computer Management snap-in is automatically loaded, as well.

However, you can manually load snap-ins and create custom consoles that you can save and use later. You can open an empty MMC by clicking Start → Run, then typing **mmc** in the dialog box and clicking OK. Figure 10-1 shows you an empty MMC with no snap-in loaded. As you can see, there really isn't anything you can do without a snap-in.

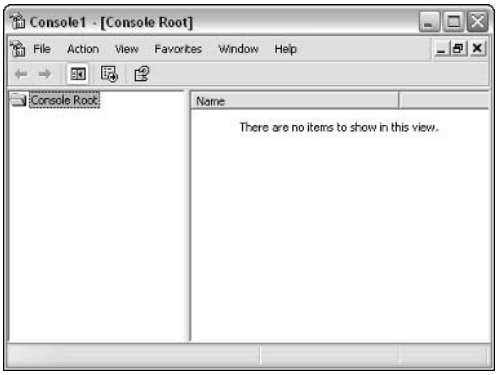

Figure 10-1: An empty MMC.

Why did Microsoft integrate the MMC so heavily with Windows XP? The answer is in an attempt to reduce administrative overhead, learning, and general aggravation. For example, in Windows NT Server 4.0, each administrative tool had its own GUI interface with its own menus and commands. Learning a different interface for each administrative tool made administration more difficult than necessary. With the MMC, all administrative tools look exactly the same and have the same menus and basic functionality. This feature makes the administrative learning curve much easier to master. Another great benefit of the MMC is that you can build your own custom consoles that contain the tools you most commonly use. For example, say that you frequently use the Disk Management tool and Users and Groups tool. You could create a custom console containing both of these tools so you can more easily access them. The possibilities are endless, and the MMC can make your administrative tasks easier. Finally, another benefit of the MMC is that third-party companies can build snap-ins for the Windows environment.

Getting to Know the MMC

So, now that I have sold you on the importance and benefit of the MMC (hopefully), you can use this section to master the MMC. Fortunately, the MMC is quite easy to use, but I'm going to show you several tips and tricks that you can use in your daily use of the MMC. I've organized this section by topics so you can quickly work through it and find the topic you need help with. Also, whenever possible, I have organized information in a step-by-step format for easy reference.

Loading Snap-ins

To manually load a snap-in or several snap-ins into an empty MMC, follow these steps:

1. Click Start → Run. Type **mmc** in the dialog box and click OK. The empty console appears.
2. In the MMC, click Console → Add/Remove Snap-in.
3. The Add/Remove Snap-in window appears. Click the Add button.
4. A list of standalone snap-ins appears, as shown in Figure 10-2. Select the desired snap-in, and then click the Add button. Repeat this step to load additional snap-ins. When you are finished, click Close.

If you're unsure about a particular snap-in, select it. A description of the snap-in will appear in the lower half of the window.

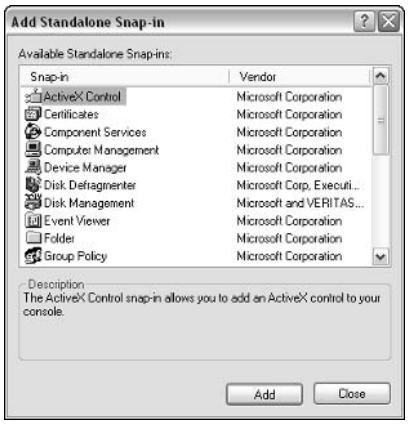

Figure 10-2: Adding a standalone snap-in.

5. Depending on the snap-in you select, a Computer Management dialog box may appear, as shown in Figure 10-3. In this dialog box, select whether the snap-in will manage the local computer or another computer. If you want to use the snap-in to manage another computer, enter the name of the computer you want to manage.

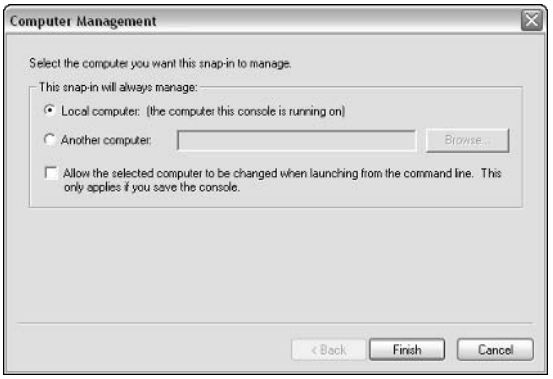
Computer Management
Select the computer you want this snap-in to manage.
This snap-in will always manage:
Local computer: (the computer this console is running on)
Another computer:
Browse...
Allow the selected computer to be changed when launching from the command line. This only applies if you save the console.
< Back
Finish
Cancel

Figure 10-3: Snap-in management option.

6. After you click Finish, you are returned to the Add/Remove Snap-in dialog box, as shown in Figure 10-4. You see the snap-ins you selected displayed. If you made a mistake, just select the snap-in you do not want to use and click the Remove button. You can also click the About button to learn more about the snap-in. Click OK when you're done.

Add/Remove Snap-in
Standalone
Extensions
Use this page to add or remove a standalone Snap-in from the console.
Snap-ins added to:
Console Root
Computer Management (Local)
Local Computer Policy
Description
This snap-in allows you to edit Group Policy Objects which can be linked to a Site, Domain, or Organizational Unit in the Active Directory or stored on a computer.
Add...
Remove
About...
OK
Cancel

Figure 10-4: Add/Remove Snap-in.

7. Also notice that there is an Extensions tab, shown in Figure 10-5. On the Standalone tab, select the desired snap-in, and then click the Extensions tab. The Extensions tab also lists other snap-ins that are dependent on the selected snap-in.

Figure 10-5: Extensions tab.

By default, all extensions for a snap-in are automatically loaded.

Once you have loaded the snap-ins, you see that they now appear in the console and are ready for you to use, as shown in Figure 10-6.

Saving a Console

The primary reason for manually loading snap-ins is to enable you to create a custom MMC. This simply means that you load the desired snap-ins and then save the MMC. Once saved, you can open the MMC at any time and access your snap-ins. Administrators find this feature very useful because they can group their most commonly used snap-ins into one console and use that single console for their administrative tasks. After you load your desired snap-ins, simply click Console→ Save As to save your console. MMCs are saved as .msc files (MMC). You can give the console a name and select the location on your system where you want to save the console, just as you would any other file.

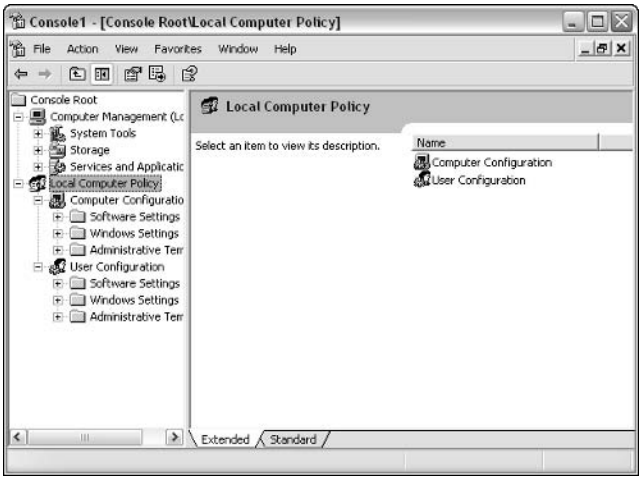

Figure 10-6: The new console.

Opening a New Window

The MMC enables you to open several windows at one time. The question you might ask is why? You can open the same console window in several instances to make your work easier. For example, in Figure 10-7 there are two windows open. The windows appear in the same console, but you can see that in one window is Computer Management and in the second window is Local Computer Policy. This feature enables the user to work with several different snap-ins at one time by keeping them organized in their own window. To open a new window, just click Window → New Window. If you have several windows open at one time, you can easily adjust how they appear in the console. Just click the Window menu and select either cascade or tile horizontally. Also, you can drag each window around inside of the console and place it in a manner that is easy for you to use.

Configuring Console Options

To give you different levels of control, the MMC provides you, as the author of the MMC, with some options you can choose to implement. Click File → Options. You see an Options dialog box, as shown in Figure 10-8, that enables you to perform a few different actions.

Figure 10-7: Your snap-ins can appear in different windows.

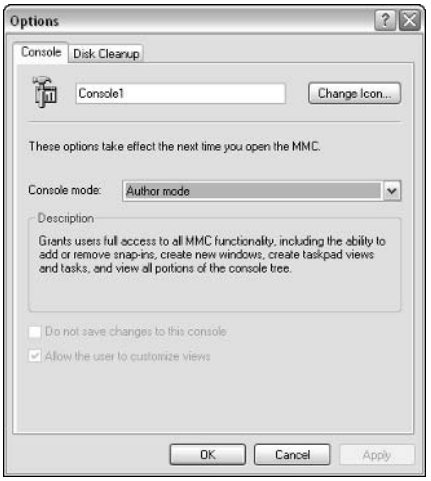
Options
Console Disk Cleanup
Console1
Change Icon...
These options take effect the next time you open the MMC.
Console mode:
Author mode
Description
Grants users full access to all MMC functionality, including the ability to add or remove snap-ins, create new windows, create taskpad views and tasks, and view all portions of the console tree.
Do not save changes to this console
Allow the user to customize views
OK
Cancel
Apply

Figure 10-8: Console options.

First, you have the option to change the default icon for the console by clicking the Change Icon button. This action enables you to select a different icon or use one of your own. More importantly, you have the option to configure a *console mode* for the MMC. A console mode either enables or denies the user certain console rights. For example, say you are an administrator. You create a custom console containing Disk Management and User and Groups for certain administrators. Once you have created the console, you can change the console mode so that other

administrators cannot make changes to the console. This feature enables you to create the console, and then have others use the console without fear of configuration changes being made. You can choose from several modes; the following list explains the options to you:

- **Author mode** – This is your current mode. In author mode, you have full MMC functionality. You can add or remove snap-ins, create TaskPad views, and perform any other function within the console.
- **User mode: Full Access** – This mode gives users full access to all console and window commands, but the user cannot add or remove snap-ins or change the console's properties.
- **User mode: Limited Access, Multiple Window** – This mode gives users access rights only to the console areas that were visible when the console was saved. Users can create new windows but cannot close existing windows.
- **User mode: Limited Access, Single Window** – This mode gives the user access only to areas that were visible when the console was saved. However, the user cannot open new windows.

Any changes you make to the MMC mode take effect the next time the console is opened.

For all mode options, you also see two check boxes at the bottom of the window that you can select or deselect. The two options are as follows:

- **Do not save changes to this console** – The user cannot save any changes made to the console.
- **Allow the user to customize views** – This enables the user to customize the window view.

Using the Action Menu

The Action menu is the primary menu you use to manage snap-ins and their components. In a console that has more than one snap-in, use your mouse and select the snap-in you want to use. From that point, most of your configuration and usage of the snap-in is accomplished through the Action menu. Click the plus sign (+)

next to the snap-in to expand it, then select any desired components and use the Action menu again. You'll notice that the contents in the Action menu change according to what you have selected.

Right-clicking on any snap-in or snap-in component gives you the same list of options found on the Action menu.

Using the View Menu

The View menu enables you to make changes to the appearance of the console and your snap-ins. You have the following options:

- **Choose Columns** – This feature enables you to change the column labels that appear in the right pane. For example, in the Domain Name System (DNS) snap-in, you can expand the DNS server and select a desired DNS zone. The zones appear in the right pane giving you the name, type, and status. You can use the Choose Columns option to change which columns are displayed for the snap-in.
- **Large Icons** – This feature provides large icons in the details pane of the console.
- **Small Icons** – This feature provides small icons in the details pane of the console.
- **List** – This feature provides small icons in a list format in the console's details pane.
- **Detail** – This feature provides a list with column information.
- **Advanced** – This feature turns on the console's advanced information features. The Advanced option makes certain information, such as security, available in some snap-ins.
- **Filter** – Some snap-ins have a filter option that appears in this menu. For example, DNS has this feature. Filter enables you to filter certain names so that you are not overwhelmed with console information. In other words, the filter helps you to display only information you want.
- **Customize** – The customize option gives you a Customize View window, as shown in Figure 10-9. You can use these check boxes to customize the console appearance, as desired.

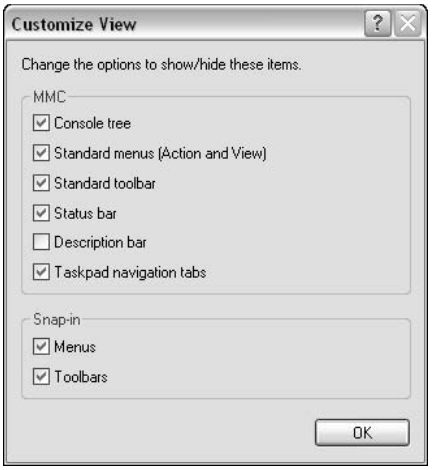

Figure 10-9: Customize View.

Using Favorites

You see a Favorites menu in the MMC. This is similar to Internet Explorer's favorites list, which you generate as you find Web sites you like. In a similar manner, you can add items to a favorites list in a console. For example, say that I like to check my system's interrupt request lines (IRQs) on a regular basis (hey, this is just an example). I have the Computer Management snap-in loaded. I can examine those pesky IRQs by expanding Computer Management → System Tools → Hardware Resources → IRQs – or I can just add IRQs to may favorites list, click the Favorites tab, and see them easily whenever I want.

You can manage your favorites by using the Favorites menu. You have two options here:

- You can choose to add an item to your favorites list. Just select the desired item in the console and click Favorites → Add to Favorites.
- You can click Favorites → Organize Favorites to open a simple organization window. Here, you can delete items, rename them, move them to various folders, and even create folders within your favorites list.

Creating Taskpad Views

The MMC includes an important feature that you can use to greatly simplify difficult administrative tasks, or one that you can use to make things easier for inexperienced personnel. That feature is Taskpad views. Taskpad views enable you to create a custom view of the console's details pane or generate icons that enable you to start certain functions with only a double-click (like a shortcut). You have a number of options with Taskpad views, and as I think you will see, you can use

them for a variety of situations. The following steps show you how to create a new Taskpad view:

1. To create a Taskpad view, select the desired snap-in in the console, then click Action → New Taskpad View.
2. The New Taskpad View Wizard appears. Click Next on the Welcome screen.
3. In the Taskpad Display window, shown in Figure 10-10, select a style for the Taskpad by clicking the Vertical list, Horizontal list, or No list radio button. The graphic in the right part of the window shows you how the display will appear. At the bottom of the window, select a style by clicking either the Text or InfoTip radio button. The Text option makes explanatory text appear next to the icon. The InfoTip enables the text to be displayed in a pop-out form. You can use the drop-down menu to change the size of the lists. Click the Next button once you have made your selections.

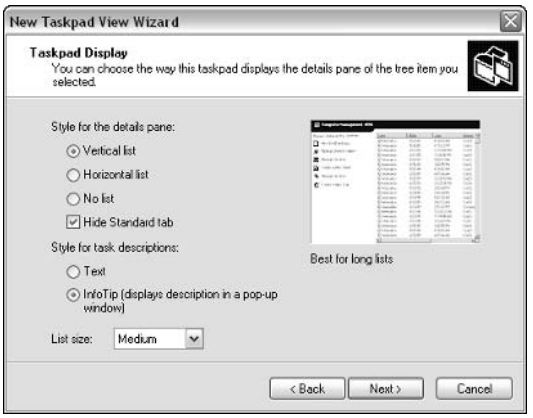

Figure 10-10: Taskpad Display.

4. In the Taskpad Target window, shown in Figure 10-11, select the desired radio button to determine if the Taskpad view applies to the current tree item or to all tree items of this type. Make your selection and click the Next button.
5. In the Name and Description window, enter a desired name for the Taskpad view and a description. Click the Next button.
6. The Summary window appears. Notice that a check box appears so you can start the New Task Wizard. Leave this check box selected; then click the Finish button.

New Taskpad View Wizard
Taskpad Target
You can apply this taskpad view to more than one tree item.
Select whether this taskpad view will apply to the current tree item only, or to all tree items of this type.
Apply this taskpad view to:
Selected tree item
All tree items that are the same type as the selected tree item
Change default display to this taskpad view for these tree items
< Back
Next >
Cancel

Figure 10-11: Taskpad Target.

7. The New Task Wizard begins. Click Next on the Welcome screen.
8. In the Command Type window you have three radio button options, shown in Figure 10-12 and defined in the following list:
   - **Menu command** – Enables you to configure a task that runs a menu command within the MMC.
   - **Shell command** – Enables you to configure a task that automatically runs a script, starts a program, opens a Web page, or some other shell command.
   - **Navigation** – Enables you to configure a task that automatically navigates to a selected view in your favorites list.

New Task Wizard
Command Type
Tasks can run command lines, launch menu commands, or navigate to other tree items.
Choose the type of command you want to use for this task.
Menu command
Run a command from a menu.
Shell command
Run a script, start a program, or open a Web page.
Navigation
Navigate to a view selected from your Favorites tab.
< Back
Next >
Cancel

Figure 10-12: Command Type.

For the example here, I will configure a Menu command. You can experiment with Shell commands and navigation, and you will discover that they are self-explanatory. Select the Menu command radio button and click the Next button.

9. The Shortcut Menu Command window appears, as shown in Figure 10-13. You see a Command source drop-down menu, which contains a tree item task and list in details pane task. Select the desired option. For a tree command, you see the console tree items and available commands. Note that the commands available are simply menu commands for the item selected, such as Action → All Tasks → Disk Management, Action → Properties, and so forth. Make your desired selection and click the Next button.

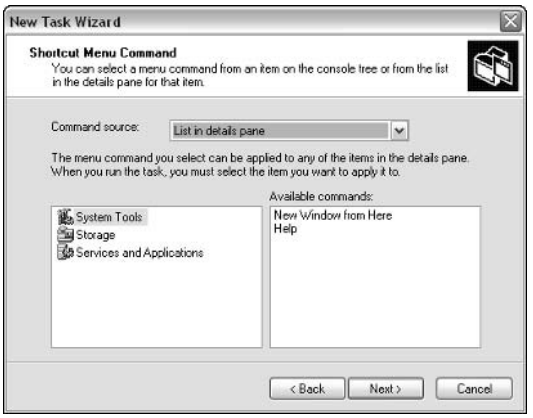
New Task Wizard
Shortcut Menu Command
You can select a menu command from an item on the console tree or from the list in the details pane for that item.
Command source:
List in details pane
The menu command you select can be applied to any of the items in the details pane. When you run the task, you must select the item you want to apply it to.
Available commands:
System Tools
Storage
Services and Applications
New Window from Here
Help
< Back
Next >
Cancel

Figure 10-13: Shortcut Menu Command.

10. The Name and Description window appears. The text you enter appears as either text in the console or as InfoTip text, depending on what option you select. Make your entries, and click the Next button.

11. In the Task Icon window, shown in Figure 10-14, select a desired icon for this task and click Next.

Try to select an icon that visually describes your task.

12. Click the Finish button to complete the wizard.

New Task Wizard
Task Icon
You can select one of the icons provided by MMC to represent this task, or you can select a custom icon.
Icons provided by MMC
Icon symbolizes: Help, troubleshoot
Alternate meaning: Document, file
Custom Icon
Browse...
< Back
Next >
Cancel

Figure 10-14: Task Icon.

If you want to create additional tasks, click the Run this Wizard Again check box before clicking Finish.

After you complete the wizard, you see your Taskpad view and any tasks you have created in the details pane, as shown in Figure 10-15.

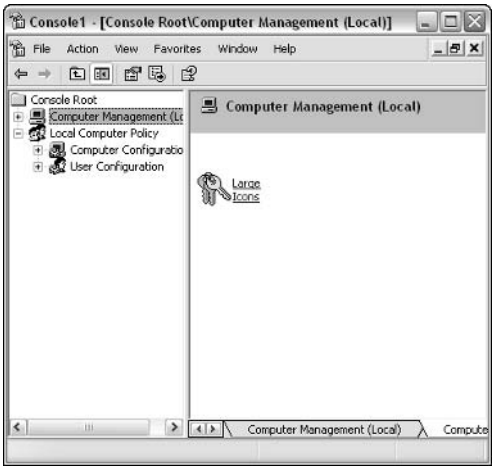

Figure 10-15: Tasks appear in the details pane.

You can easily create new tasks, delete them, or alter your Taskpad view by clicking Action → Edit Taskpad View.

Tips and Tricks

Overall, the MMC is a great tool and is easy to use. The point of the MMC is to provide you with more management flexibility when you work with Windows XP, so keep the following points in mind as you use it:

- Remember to keep the consoles you create organized and useful. Do not add too many snap-ins to a single console because the console may get more confusing than helpful. If you are creating custom snap-ins, try to keep them organized in a way that is helpful to you.
- Remember to experiment with the View menu. The customization options on the View menu may give you exactly what you need to make the MMC more useful to you.
- You can add or remove a snap-in at any time by clicking File → Add/Remove Snap-in.
- Use File → Options to manage authoring modes.
- Keep in mind that you can use Taskpad views to automate tasks so you can perform them simply by clicking a button. This feature is helpful if you have other users running MMC consoles and performing tasks. You can automate tasks using taskpads so that the MMC is easier to use.

Chapter 11

Networking on a Workgroup

IN THIS CHAPTER

- Understanding networking
- Setting up a workgroup configuration
- Managing workgroup hardware
- Configuring a workgroup
- Managing connections and IP
- Solving common problems

IN THE PAST, NETWORKING was reserved for businesses or large corporations that had extra money to throw around. Only a few years ago, the average computer user would never have dreamed of being able to configure a home or small office network in an effective and useful manner. All of that began to change a few years ago when networking technologies slowly began to streamline and become more commonplace. Today, many households and most small offices have a computer network of some kind. Networking with Windows XP is easier than it has been with any previous version of Windows. Windows XP does more and is easier to network than you first might think. This chapter explores workgroup networking with Windows XP. You'll understand the basics of how a network works, how you can configure one, and how to solve common networking problems.

Networking 101

There are two basic kinds of networks used in the world today. The first is generally considered the workgroup, which is explored in this chapter, and the second is the server-based network. A workgroup network, which is also called a home network or a small office network, is made up of a collection of computers, such as Windows XP Professional or Home edition, Windows 2000, Windows Me, and so forth. In a workgroup network, each computer user manages his or her own computer on the network. Of course, the lines between a workgroup and a server-based network can become confusing. After all, many workgroups are quite large,

and some even have a computer administrator for all of the computers and the network. The defining difference comes down to management and security. A workgroup has no centralized server, so there is no centralized management and security. A server-based network uses servers for logon and management of client computers.

Refer to Chapter 12 for more information on using servers for logon and management of client computers in a server-based network.

Of course, the main purpose for networking is to share resources between computers. In a workgroup network, you can share folders, printers, Internet connections, disk drives, and other resources between computers on the network. In a server-based network, sharing is also a major feature, but the additional features of security and centralized management also come into play.

In the past, the need for a network was typically found at the business level only. However, today, many homes and small offices use workgroup configurations to share information, printers, and even play games between different computers over the network. In short, the idea of networking computers together is becoming rather commonplace and for good reason.

From a networking 101 point of view, what do you need to network Windows computers together? First of all, computers have to be outfitted with the proper hardware. This generally includes a network interface card (NIC) of some kind. Many computers sold today ship with a standard Ethernet card built in so that the computer is network ready. In addition to the NIC, you'll need a hub, which is a device that connects all of the computers to a centralized control box. It basically functions as the traffic cop. Many different kinds of hubs are available on the market today. You'll also need cabling, unless you are using a wireless network. The hardware you'll need is explored later in this chapter.

Next, your computer must be configured to network with other computers. This includes the proper configuration of a communications protocol, such as TCP/IP (see the next section for an overview), and other networking services within Windows XP, such as File and Printer Sharing. Windows XP configures these items for you automatically through a Network Setup Wizard.

The rest of this chapter explores the details of setting up and configuring a workgroup network.

A TCP/IP Primer

For computers to communicate on a network, they must speak the same language. In computer terms, that language is called a *protocol*. A protocol is really a set of

instructions a computer uses to communicate with another computer; so, to network a group of computers together, they must use a common protocol for communication to take place.

There are many different protocols in the computer world today, but across the board, the defacto standard for workgroup, server-based networks, and Internet networking is Transmission Control Protocol/Internet Protocol (TCP/IP). In the past, TCP/IP was used on the Internet and in larger networking environments. Its reputation for being difficult to work with and configure kept it out of the smaller networking arena. Today, TCP/IP is still a complicated protocol, but new features make its use on a workgroup easy and automatic. In fact, if you so choose, Windows XP can completely configure TCP/IP and use it on a workgroup without the users really even having to know of its existence!

However, as an advanced computer user, you might want to know some things about TCP/IP. After all, armed with knowledge, you have more configuration options and you'll understand how to troubleshoot network connectivity in a more effective way if you know a few things about TCP/IP. You can use this section of the chapter as a primer to this all-important protocol.

TCP/IP Addressing

Each computer on a TCP/IP must have a unique IP address. Think of it as the U.S. mail system. To get your mail, you have a unique address. However, that address has certain characteristics and features in common with other addresses because your address resides within a certain city and state. TCP/IP is similar because each computer on the network must have a unique TCP/IP address. However, the computers also have some addressing similarities. The TCP/IP address, then, is made up of three distinct parts, collectively called the *IP address*. They are as follows:

- **Address** – The actual IP address is a four-part decimal number separated by periods, such as 10.50.200.33. Each portion of the address helps the computer know what network and subnet it is on.
- **Subnet mask** – The subnet mask tells the computer how much of the IP address is the actual computer address and how much notes the subnet on which the computer resides. Subnets aren't anything to worry about in a workgroup, but in larger networks, subnet mask configuration can be a confusing part of TCP/IP.
- **Default gateway** – The default gateway provides the IP address of a router or computer that leads out of the subnet. Again, on workgroup configurations, default gateways generally are not needed.

IP addresses, such as 10.50.200.23, are made of two components: the network and the host ID. IP addresses are 32 bits long (32 individual 1s or 0s) and are arranged in four groups of eight bits known as octets. Each of these octets can be converted into a more user-friendly decimal number. It is in this decimal form that

most IP addresses are displayed. While this user-friendly form makes it easier to configure the IP address of network hosts, you do need to understand how to translate from the decimal form to the binary form to understand how IP addressing really works. For example, the IP address 10.50.200.23 (in decimal form) is represented as 00001010.00110010.11001000.00010111 (in binary form). Each of the four octets has a possible value between 0 and 255 or 00000000 and 11111111. To identify which portion of the address identifies the host and which part identifies the network, the subnet mask is used. When the subnet mask and the IP address are added together (in binary form), the result will identify which portion of the IP is network and which portion is host.

Do you really have to calculate all of this information to use TCP/IP? No, as I mentioned, Windows XP can do it for you, but it is helpful information to know. The most difficult part of understanding TCP/IP addressing is the subnet mask. Early on in the design of IP it was found that there was a need to organize how IP addresses would eventually be allocated to hosts. To facilitate this, default subnet masks were assigned to IP address ranges. These assignments are known as *address classes*. To work with IP on your network, you should understand the three primary classes: Class A, Class B, and Class C. The matching of IP addresses to address classes is based on the binary arrangement of the IP address. However, in this case, it is easier to just look at the decimal value of the first (leftmost) octet. For example, 16.45.233.166 would be a Class A address because the number 16 (the value of the first octet) is within the established range for Class A addresses. Using the first octet, the address classes are defined as follows; Class A includes 1–126, Class B 128–191, and Class C 192–223. Each of these classes has a default subnet mask assigned as well: 255.0.0.0 for Class A, 255.255.0.0 for Class B, and 255.255.255.0 for Class C. So, the previous example of 16.45.233.166 is a Class A address with a subnet mask of 255.0.0.0. This means the network portion of the address is 16 and the host address is 45.233.166.

Along with these established classes, there are a few reserved and special-purpose address groupings. You may have noticed that addresses beginning with 127.0.0.0 are not in any of the default classes. This is because the address 127.0.0.1 is reserved as the Loopback address. When a host uses this address, it identifies the host itself. This address is useful when troubleshooting IP on a host, which you'll learn more about later in this chapter.

Other specialized addresses include reserved experimental IP address classes. Any IP address beginning with the value 224–524 is reserved for an array of special purposes and, for the most part, should never be assigned to a workstation. In addition to these specialized classes, there are several IP address ranges designated as private IP addresses. These ranges reside (one each) with each of the major address classes (A, B, and C). A private address is only useable on a network that does not connect to a public network directly. A router must be used to connect a network using a private IP address range with a public network such as the Internet. The reason for these private ranges is simple: As the use of networks increased, it became apparent that eventually there would be no more IP addresses left for host assignments because there are a finite number of addresses possible. Private IP addresses (the same address) can be used in multiple networks because a

router translates between the private and public network. For example, the Boston branch of a company can use 192.168.44.0 as its network address pool, and the Seattle branch can use the same exact address pool. The private IP address ranges are 10.0.0.0–10.255.255.255 (Class A), 172.16.0.0–172.32.255.255 (Class B), and 192.168.0.0–192.168.255.255 (Class C).

TCP/IP Protocols

The TCP/IP protocol is actually a suite of protocols. To give network users the vast functionality they demand, and to provide the kind of Internet networking wanted today (streaming media, Internet radio, e-mail, and so on), TCP/IP has to wear many different hats. To provide these services, TCP/IP is actually a suite of protocols that live under the name of TCP/IP. In fact, over 100 protocols exist in the TCP/IP suite that can be used as needed.

Delving into all of those protocols isn't necessary, but I thought I would mention a few of them, so you can understand how vast TCP/IP really is.

Some of the more common TCP/IP protocols with which you are probably familiar are as follows:

- Domain Name System (DNS)
- File Transfer Protocol (FTP)
- Telnet
- Hypertext Transfer Protocol (HTTP)
- Simple Mail Transfer Protocol (SMTP)
- Simple Network Management Protocol (SNMP)

These commonly used protocols are called *application layer protocols*. Within TCP/IP are the Transmission Control Protocol (TCP) and the User Datagram Protocol (UDP). Each has its own properties and uses, and they determine how data is broken apart for network travel and reassembled. TCP is used to provide a reliable connection over a medium (network) that sometimes is not the most reliable of creatures. Basically, TCP addresses the fact that hardware can't always be trusted to get data from point A to point B without losing a few bits here and there. TCP compensates by implementing error detection and correction. When two hosts begin to establish a session using TCP, the hosts negotiate a set of criteria that will allow each of the participating hosts to determine if all of the data they send makes it to the intended recipient.

Other common TCP/IP protocols include the following:

- Internet Protocol (IP)
- Address Resolution Protocol (ARP)
- Internet Command Messaging Protocol (ICMP)

Internet Protocol is the most significant protocol in use in modern networking. Virtually every networking operating system supports it, and without it, there would be no Internet. IP was examined in some detail earlier, but it bears mentioning again that IP is used to uniquely identify hosts within the confines of the networks where they reside. Popular technologies, such as the World Wide Web, Instant Messaging, e-mail, and streaming audio/video, depend on IP to operate. IP sets the stage for one host to make contact with other hosts. But even with the IP address of a target in hand, a network application will still need to resolve the Mandatory Access Control (MAC) address of that host (or the device that can get the host in touch with its desired target) before a host can actually establish communication.

ARP is used to discover the MAC address associated with a particular IP. Where an IP address is unique to a host within the confines of a network, the MAC address is unique to the host among all other devices on earth. ARP sends a broadcast requesting the MAC address associated with a particular IP address.

Finally, ICMP is a test protocol used to determine network connectivity. It is commonly called the ICMP Echo Reply. ICMP is used to collect a wide range of information about the status of IP processing on network hosts. You'll see some examples of how to use it later in this chapter.

APIPA

If all this talk about IP addressing and protocols has given you a headache, you are certainly not alone. TCP/IP addressing can be complicated and confusing, and, for this reason, it was not used on smaller networks in years past due to its administrative overhead. However, the advent of some new IP addressing features means TCP/IP can work essentially in an automated way, and that occurs through Automatic Private Internet Protocol Addressing (APIPA).

As I mentioned previously, each computer in a TCP/IP network must have a unique IP address. So, what if there is a network with 10,000 computers? Do the network administrators have to configure each computer with an IP address? As you can imagine, such a task would be overwhelming and full of human error. In such cases, server-based networks use a Dynamic Host Configuration Protocol (DHCP) server. The DHCP server is simply a server that assigns IP addresses to network clients and keeps track of which client has which address. The automated method for IP address assignment keeps manual configuration to a minimum.

What happens on a small network where no DHCP server is used, such as a workgroup? In the past, you would have had to manually configure each computer to use TCP/IP. No longer, though, with APIPA. APIPA is a service that automatically runs on Windows XP after Windows XP has been configured for networking. Essentially, APIPA allows Windows XP to act as its own DHCP server. APIPA uses an IP address range of 169.254.0.1 through 169.254.255.254. When a Windows XP computer first comes online, it queries the network for a DHCP server. If no server is found, which it will not be on a workgroup, the Windows XP computer assigns itself an IP address from the IP address range. Before doing so, it queries the network to make sure no other computer is using the address. The computer assigns

itself the address and can begin participating on the network. As you can see, in a workgroup setting, APIPA allows the Windows XP computers to configure themselves without any awareness of the users on the network. This is a great benefit that makes home and small office networking easy.

You can use APIPA, or you can override it and configure the IP addresses yourself. You'll see how later in this chapter.

Exploring Types of Workgroups

To create a workgroup, you'll first have to decide on the kind of workgroup that you want. There are four major options within the Windows XP realm:

- Direct Cable Connection
- Ethernet
- HomePNA
- Wireless networks

The following sections explore those options so that you can make a decision that is right for you.

Direct Cable Connection

A Direct Cable Connection (DCC) is not really a workgroup configuration in the true sense of the word, but it does bear mentioning here because it is a quick and easy method to connect two computers together. Say you have two computers in an office and you simply need to exchange files from one PC to the other. No problem, you can use the DCC. What if you travel a lot with a laptop computer and need a temporary connection to another computer? Again, the DCC is the easiest way to go.

Using a DCC, you can establish a connection between a Windows XP computer and any other Microsoft Windows computer that supports DCC connections. They basically all do (Windows 95 and beyond). To create a DCC connection, you need a null modem cable or a serial cable made for DCC connections. You can find these cables at any computer store. You can also use a DirectParallel cable, also available at any computer store.

Be advised that DCC connections are slow, generally about the speed of a modem, and as such, they are designed for limited and temporary use. See the *Creating a Direct Cable Connection* section later in this chapter for the steps to create a DCC.

Ethernet

Ethernet is a networking standard and the most popular kind of network in use today. When you think of a network with a typical wired configuration, you are generally thinking of Ethernet. Ethernet was first introduced in the 1970s by Xerox, and is defined by the Institute of Electrical and Electronics Engineers (IEEE) 802.3. This specification defines how hardware devices must function to conform to the Ethernet standard. For this reason, you can use a mixture of Ethernet NICs from different vendors with no compatibility problems. Ethernet NICs connect to RJ-45 cables (which look like larger phone cables), and you'll require an Ethernet hub, router, or residential gateway, depending on your needs. See the upcoming section, *Getting to Know Workgroup Hardware,* for more information. Ethernet networks provide three different speeds, which must be supported by the NICs that you purchase:

- **10 Mbps** – The 10BaseT Ethernet standard defines 10 megabits per second (Mbps) transfer speed.
- **100 Mbps** – The 100BaseT (also called Fast Ethernet) standard supports up to 100 Mbps transfer speed.
- **Gigabit Ethernet** – Gigabit Ethernet is a new speed standard that provides 1,000 Mbps, or 1 Gbps. You must have Gigabit Ethernet NICs and hubs to get the speed, but you still use the same RJ-45 cabling.

HomePNA

HomePNA is another type of network topology that is designed for home use, but it works well in small offices too. HomePNA networks use typical PCI or USB NICs, but each NIC connects to a standard phone jack in the home or small office using a standard RJ-11 phone cable. Rather than using a hub and having wiring running everywhere, you simply use existing phone lines as the network. Even though the computers are connected to the phone lines, you can still have voice conversations. This type of setup works great in homes or small offices where computers reside in different rooms. You don't have to run additional cabling and you don't have to worry about a hub. If this sounds like a dream come true, it certainly does solve a number of problems. However, the problem with HomePNA is that you are limited to 10 Mbps. It works fine if you are sharing only files and printers, and accessing the Internet, but if you need to run large multimedia files over the network or play network games, the speed is a little slow. For most users, however, the 10-Mbps speed is all you need to use the network and access a broadband Internet connection from a residential gateway or ICS host computer. Some small office networks even combine existing Ethernet networks with HomePNA networks for more flexibility. In this case, you'll need one Windows XP computer to act as a network bridge. See the *Configuring Network Bridges* section later in this chapter for details.

Wireless Networks

Wireless networking has been around for some time, but many people who have been interested in wireless networking have abandoned it due to compatibility problems and a general lack of reliability. However, wireless networking has come a long way, and Windows XP Professional includes a number of features that support common wireless networking standards and hardware. In short, if you need a wireless network, Windows XP has what you need to create and configure it.

Just as there are different wired networks, such as Ethernet and HomePNA, there are also several different types of wireless networks. These different types of wireless networks define different standards to which hardware manufacturers must adhere when creating wireless networking components and devices. The following list explores each of the major types:

- **Infrared** – Infrared wireless uses an infrared beam to transmit data from one device to the next, and is most often used in PC devices. For example, wireless keyboards, mice, printers, and game devices can connect with an infrared port on your computer. Additionally, laptops and PDAs can connect with a desktop computer for data transfer. Infrared is a great solution for device-to-PC connectivity, but in terms of an actual LAN, infrared is not a preferred connectivity method.
- **Wireless Personal Area Networks (WPANs)** – A WPAN is a personal area network, meaning it resides in one generalized space, such as a room. In other words, a personal area space is the area surrounding a person. WPANs are useful for wireless network computing in one location, or wireless networking between PDAs, cellphones, laptop computers, and so on. WPANs can make use of infrared connections for objects that are very close, or you can also use Bluetooth, which communicates through radio waves up to 30 feet. The IEEE has established a working group for the development of WPANs numbered 802.15. You can learn more about the standard by simply searching for IEEE 802.15 on any search engine.
- **Wireless Local Area Networks (WLANs)** – A WLAN is a wireless network that exists within one geographic location, such as in a home, office building, school, or other such structure. The IEEE 802.11 standard for WLANs defines transfer rates at 1 to 2 Mbps. As you can see, the 802.11 standard was rather slow. However, today, the new IEEE standard for WLAN networking is 802.11b, which defines data transfer rates of up to 11 Mbps using a 2.4-GHz frequency band. 802.11b is the popular standard today, which provides speeds comparable to a typical Ethernet network.
- **Wireless Metropolitan Area Networks (WMANs)** – WMANs allow communication between different locations within a single metropolitan area. For example, perhaps your company resides in New York, but three offices are located in different parts of the city. Using wireless technologies, a WMAN could be created so that communication between those different

offices could connect. The IEEE 802.16 standard has been approved, so you can expect to see growth in this area of wireless networking.

- **Wireless Wide Area Networks (WWANs)** – A WWAN connects WLANs that are separated over wide geographic areas. For example, if your company has offices in New York, Seattle, and Dallas, a WWAN could be used to wirelessly connect the different WAN network segments. WWAN technologies involve the use of satellite communications maintained by service providers, and use the same technologies used by cellular phones and wireless PDAs.

Both Windows XP Professional and Windows XP Home editions support infrared and 802.11b wireless networking. The 802.11b standard, also called Wi-Fi, is the most popular wireless networking standard in use today, providing transfer rates of around 11 Mbps. In a Wi-Fi network, you have a range of up to 300 feet from point to point, and it provides the best wireless security that is currently available. Because Wi-Fi is the most popular, you'll find plenty of wireless network devices at any computer store that are compatible with Windows XP. If you are shopping for wireless devices, look for compatibility information right on the box. Also, you should see an "802.11b standard" or "Wi-Fi standard" note on the box as well.

UNDERSTANDING INFRARED

Infrared technology uses a line-of-sight infrared beam to send data from one device to the next. It is the same principle as a grocery store scanner. The two infrared devices must be in range and aligned, or pointing to each other. The single infrared beam then transfers the data. Because you have to line up the two infrared ports on the two computers or the device (such as a PDA) and the computer, infrared networking is not as practical as Wi-Fi.

UNDERSTANDING WI-FI

Wi-Fi networks provide two different topologies, or modes. Wireless NICs can support either of the two modes, which are called Infrastructure mode and Ad Hoc mode. In Infrastructure mode, an existing wired LAN, such as Ethernet, extends to include wireless devices. The wireless devices use a hub, called an *access point*, that connects to the wired LAN's hub. In other words, the access point manages all of the traffic between the wired network and the wireless devices, just as a typical hub might do. As with a hub, the access point can support a certain number of wireless clients, depending on the model you purchase, and you can also use several access points in a daisy-chain fashion, if necessary.

Ad Hoc mode allows one wireless computer to connect to another without the use of an access point. For example, say you have four wireless computers in the same room. Rather than using an access point, the computer's wireless NICs can be configured to use Ad Hoc mode. The four computers can communicate with each other, and because no interface is needed with a wired network, an access point is not necessary.

You can also use Infrastructure mode and Ad Hoc mode at the same time, through a process called *Zero Configuration*. When in infrastructure mode, all wireless NICs look for an access point. If one is not found, the NICs switch to Ad Hoc mode so that communication with other computers within range can occur. Windows XP can automatically configure wireless NICs from Infrastructure mode to Ad Hoc mode, and vice versa.

Getting to Know Workgroup Hardware

After you have explored the types of workgroup configurations and options available to you, you need to make a decision about the kind of workgroup you want to create. After all, each kind of workgroup, from Ethernet to HomePNA to wireless, uses different kinds of hardware. So, your first step is to decide on the kind of

Wireless Security 101

Most of us would rather not spend our time thinking about or worrying about security. However, in an age of electronic theft and malicious networking attacks, security is a very important issue, and in fact, the problems with wireless security have kept many networks from implementing wireless features.

Fortunately, Windows XP supports the major wireless security features that you might need to implement. 802.11b, which contains some basic security features for access points called the *Service Set Identifier* (*SSID*). An SSID is a known security identifier, and it is taken from the NIC on each computer. The access point is aware of the SSID, and once it is taken from the NIC, an association with the NIC and the SSID is made on the access point. However, the SSID is not encrypted, which makes it available for theft during transit. The 802.11b security standard really isn't that secure.

However, another security standard is commonly supported by wireless hardware called *Wired Equivalent Privacy* (*WEP*). This security standard provides a 40-bit encryption scheme. The encryption scheme prevents theft of data that is airborne, and this built-in standard provides a great measure of security, especially for home and small office wireless networks. Along with WEP, many wireless NICs also support a standard called 802.1x. The 802.1x standard provides authentication for access to Ethernet networks over a wireless access point. Using 802.1x, the access point authenticates users in conjunction with server software on the Windows network. Most major brands of wireless NICs support both the WEP and 802.1x standards, so make sure you read the box before purchasing any particular brand of wireless NIC. Although you might not need these standards or be that worried about security, it is good to know that your NICs support them.

network you want, and then purchase the hardware you'll need for that network. The following sections give you some general information about standard networking hardware that you'll need, depending on the kind of network you choose.

Ethernet Hardware

To connect network computers using Ethernet, you need to use certain types of hardware that conform to the Ethernet standard. Keep in mind that your computer will detect the kind of NIC installed and configure your network based on that standard, so there is nothing you need to do but use the correct hardware. As mentioned earlier, many PCs ship with a standard Ethernet NIC, so you might not even need to buy NICs for your PCs. However, here are the items you will need to configure an Ethernet network.

- **Ethernet NICs** – You can buy Ethernet NICs at any computer store. There are many different manufacturers, but I recommend nationally recognized brands, such as Linksys, SMZ, 3com, and so forth. You have better results and more online support should problems occur.
- **RJ-45 cabling** – You will need RJ-45 cables, which look like large phone cables, to connect the NIC to the hub. You can buy RJ-45 cables in various lengths at any computer store and even many discount stores.
- **Hub** – Ethernet networks use hubs as a central connection device. All computers connect to the hub using the RJ-45 cable, and the hub handles communication between the computers. Hubs vary greatly in price, depending on what you want. You can purchase a small, 5-port hub for a simple network for under $50. Or, you can purchase a hub with more ports and additional Internet networking and security options for several hundred dollars. Many options are on the market, so you'll have to spend some time researching your needs and wants before making a decision.
- **Routers and residential gateways** – Some optional, additional tools on the market are routers and residential gateways. These devices are used in place of a hub and provide connections to DSL and cable Internet modems. Rather than the DSL and cable modems connecting to a PC and then sharing the connection from that PC, these devices manage all of the network connections. Some even provide firewall and security features.

You can learn more about Internet Connection Sharing (ICS) and Internet Connection Firewall (ICF) in Chapter 14.

HomePNA Hardware

If you decide that a HomePNA network is right for you, all you need are HomePNA NICs and a standard RJ-11 phone cable. Remember that the existing phone wiring system in the home or office acts as the transmission medium; then the network functions by simply plugging your computer into a phone jack. In many cases, you can purchase HomePNA NICs in a quick and easy self-installation kit at your local computer store.

Wireless Networking

Like other types of networking, you'll need wireless NICs that are compatible with Windows XP, and you'll need an Access Point if you intend on using Infrastructure mode. Of course, no cabling is necessary, with the exception of an RJ-45 cable to connect the Access Point to an Ethernet hub.

- **Wireless NICs** – Wireless NICs are readily available as PCI internal NICs, USB external NICs, and PCMCIA cards for laptop computers. Generally, if you buy an internal PCI NIC, you must also buy the wireless PCMCIA card that plugs into the PCI NIC. In other words, most wireless PCI NICs simply provide a way to use the PCMCIA wireless radio NIC on the PC. Each wireless NIC has a miniature antenna for transmitting and receiving wireless data. As you might imagine, major NIC providers, such as NetGear, Linksys, SMC, and other vendors, provide wireless NICs. As a general rule, wireless NICS will cost you between $60 and $100, depending on the manufacturer and the type (PCMCIA costs more). They are a little more expensive than Ethernet or HomePNA NICs, but the price difference is not enough to prohibit you from using a wireless network. Make sure that any wireless NIC you buy is compatible with 802.11b.
- **Access Point** – The access point looks somewhat like a wired hub (except there are no ports for cable connections) with a small antenna. You connect the access point to the Ethernet or HomePNA network with an RJ-11 or RJ-45 cable, as needed. Wireless clients then connect to the access point and then the wired network. Access points generally cost around $150 to $500, depending on what you want and the brand. As with hubs, you have many options to choose from, and some wireless access points also function as a router for a DSL or cable connection, in the event that you want a completely wireless network.

Setting Up a Workgroup

When you have your hardware installed and ready, make sure everything is connected according to the hardware instructions. What you do at this point depends

on the kind of network that you want to configure. The following sections show you how to create the workgroup.

Creating a Direct Cable Connection

You can create a direct cable connection (DCC) with two Windows XP computers, or even with computers using Windows 95, Windows 98, Windows Me, or Windows 2000 operating systems. During a DCC session, one computer acts as the host (the computer you are downloading files from) and one computer acts as the guest. The guest computer accesses information from the host, and the transfer is one way. In other words, the host cannot access information from the guest computer. DCC isn't a true networking solution, but it is a way to get files from one computer to another. To create the DCC, simply connect the two computers using the null modem cable, DirectParallel cable, or even two modems, and then follow these steps:

1. Log on to Windows XP with an administrator account. You cannot create a host direct cable configuration unless your account has administrative privileges.
2. Click Start → Control Panel → Network Connections.
3. In Network Tasks, click Create a New Connection. Click Next on the wizard's Welcome screen.
4. In the Network Connection Type window, shown in Figure 11-1, select the Set up an advanced connection radio button and click Next.

New Connection Wizard
Network Connection Type
What do you want to do?
Connect to the Internet
Connect to the Internet so you can browse the Web and read email.
Connect to the network at my workplace
Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.
Set up a home or small office network
Connect to an existing home or small office network or set up a new one.
Set up an advanced connection
Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.
< Back
Next >
Cancel

Figure 11-1: Choose the advanced connection option.

5. In the next window, choose the Connect directly to another computer radio button option and click Next.

6. In the Host or Guest? window, shown in Figure 11-2, select the Host radio button and click Next.

New Connection Wizard
Host or Guest?
To connect two computers, your computer must be identified as either a host or a guest.
Choose the role you want for this computer:
Host
This computer has the information you want to access.
Guest
This computer is used to access information on the host computer.
< Back
Next >
Cancel

Figure 11-2: Choose the Host or Guest option.

7. In the Connection Device window, choose the port that you want to use for the connection (such as serial or parallel) from the drop-down menu. When you select the desired port, the port is configured for direct cable communication. You cannot use a port that currently has another device attached to it. Click Next.
8. In the User Permissions window, you can select which users are allowed to access the host computer through a direct cable connection. Notice that you can also create additional user accounts, as needed, directly from this window, as shown in Figure 11-3. Make your selections and click Next.

New Connection Wizard
User Permissions
You can specify the users who can connect to this computer.
Select the check box next to each user who should be allowed a connection to this computer. Note that other factors, such as a disabled user account, may affect a user's ability to connect.
Users allowed to connect:
Administrator
Curt Simmons
Guest
Hannah (Hannah)
HelpAssistant (Remote Desktop Help Assistant Account)
Mattie (Mattie)
Add...
Remove
Properties
< Back
Next >
Cancel

Figure 11-3: Configure the User Permissions option.

9. Click Finish. The new connection appears in the Network Connections folder under the label of incoming connection.

After you have the host set up, your next task is to set up the guest computer. For Windows XP computers, you simply use the Network Connections Wizard again and choose the Guest option instead of Host. If you are using another version of Windows as the guest, see that operating system's help files for setup instructions. In Windows XP, the connection on the client computer appears as Direct in Network Connections. Simply double-click the icon to make the connection, and then enter a valid username and password. Keep in mind that you can create multiple direct cable connections to different computers, as needed. Simply create the connections, enter the computer name to which you want to connect, and choose the appropriate port.

Configuring a Workgroup

Before you get started configuring Windows XP for networking, you'll need to make sure you have installed any necessary NICs. Arrange the physical topology of the computers and connect the network cabling (if needed) to the hub, router, or residential gateway. You should review any documentation and instructions that accompanied the hardware. After the computers are all connected, determine if you will use Internet Connection Sharing (see Chapter 14 for more information). If you will be using ICS, you need to start the configuration of the home or small office network with the computer that will host the ICS connection. Follow the steps provided to configure the computer:

1. Click Start → Control Panel → Network Connections. In the Network Tasks pane of the Network Connections window, click the Set up a home or small office network link.
2. The Network Setup Wizard appears. Click Next on the Welcome screen.
3. In the Before You Continue page, read the instructions and make sure that all network components are connected and working. If you want to set up the ICS host at this time, connect to the Internet.
4. In the Select a connection method window, select the first option if you want to use ICS. If not, choose the second or third option, depending on your needs, as shown in Figure 11-4.
5. If you chose the Other option, the next window allows you to select from the following:
   - This computer connects to the Internet directory or through a network hub. Other computers on my network also connect to the Internet directly or through a hub.

- This computer connects directly to the Internet. I do not have a network yet.
- This computer belongs to a network that does not have an Internet connection.

Network Setup Wizard
Select a connection method.
Select the statement that best describes this computer.
This computer connects directly to the Internet. The other computers on my network connect to the Internet through this computer.
View an example.
This computer connects to the Internet through another computer on my network or through a residential gateway.
View an example.
Other
Learn more about home or small office network configurations.
< Back
Next >
Cancel

Figure 11-4: Choose a connection method.

6. In Step 4, if you determined that the computer should function as the ICS host, an Internet connection page appears, as shown in Figure 11-5. Select the Internet connection that you want to share and click Next.

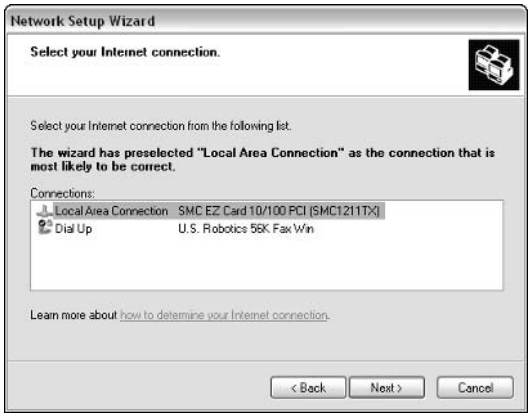
Network Setup Wizard
Select your Internet connection.
Select your Internet connection from the following list.
The wizard has preselected "Local Area Connection" as the connection that is most likely to be correct.
Connections:
Local Area Connection SMC EZ Card 10/100 PCI (SMC1211TX)
Dial Up U.S. Robotics 56K Fax Win
Learn more about how to determine your Internet connection.
< Back
Next >
Cancel

Figure 11-5: Choose the shared connection.

7. If you have multiple LAN connections installed on your computer, a page appears asking if you want to bridge those connections. You can choose to allow Windows XP to automatically bridge the connections by selecting

the provided button option, or you can choose the button option so that you can choose your own bridge connections. You can also choose no in this step and bridge the connections later; this option is explored in more detail later in this chapter. Make a selection and click Next.

8. If you chose to select your own bridge connections, a page appears so that you can select the connections to bridge. Do not choose any Internet connections – you cannot bridge a LAN connection with an Internet connection, and doing so presents a serious security breach on your network. Make your selections and click Next.
9. On the next page, give the computer a name and a description. The name you assign the computer should be a friendly name that is easily recognizable on your network. However, if you are using a broadband connection, your computer may have a required name (often true of cable modems). In that case, do not change the name if your ISP requires it to remain the same. See your ISP documentation for additional details. Click Next.
10. On the next page, assign a name for your network by typing it in the provided dialog box. By default, your workgroup is named MSHOME. However, you can change it to anything you like. The name should be friendly, and all computers on your network must use the same workgroup name. Click Next.
11. Review the settings you are about to apply on the next page. When you are sure they are correct, click Next. Use the Back button to make any necessary changes.
12. Windows XP configures the computer for networking, and you see a waiting page while the computer is configured.
13. When prompted, you can choose to create a network setup disk to use any downlevel clients. Make a selection, if necessary, and click Next.
14. Follow any additional instructions to create the network setup disk and click Finish. If all of the clients on your network are Windows XP clients, you will not need a network setup disk.

Once the first computer is installed, you are ready to begin installing the other Windows XP computers. Simply follow these same steps to install the networking software on the additional client computers. If you are using ICS, keep in mind that the Network Setup Wizard will ask you to choose how the computer connects to the Internet. Select the Connect through another computer option, and the Network Setup Wizard will locate the ICS host and proceed with setup from there.

Windows 98, Windows Me, Windows NT 4.0, and Windows 2000 clients can also natively function in your workgroup with your existing Windows XP clients. Windows 95, Windows 3.x, and earlier versions of Windows NT are not supported. These clients, collectively called downlevel clients, can be configured manually for

networking, or you can run the Network Setup Wizard on these clients, as well. To use the Network Setup Wizard, you can either use the floppy disk that you created when you configured the Windows XP clients, or you can use the Windows XP installation CD-ROM to run the Network Setup Wizard.

1. Insert the Windows XP CD-ROM into the downlevel client's CD-ROM drive.
2. On the Welcome screen that appears, click the Perform Additional Tasks option.
3. In the next window, click the Set up a home or small office network option.
4. Depending on the operating system version you are using, the Network Setup Wizard may need to copy some additional files to your computer and restart it. Click Yes to continue.
5. At this point, the Network Setup Wizard Welcome page appears. Click Next to continue. The remaining steps are the same. See the steps earlier in this section for instructions.

Configuring Wireless Networks

Wireless networks basically work like an Ethernet network, but there are some additional configuration options. For example, you can set up an infrared network to exchange data (much like a DCC), or you can configure a true 802.11b wireless network. The following sections explore these issues.

Setting Up an Infrared Network

An infrared network is a great way to exchange data between a few computers, or between a computer and some device, such as a PDA, printer, mouse, game device, and so forth. In Windows XP, infrared networking technology is implemented by the Infrared Data Association's standards (IrDA), which provides fast data transfer over an infrared beam of light. To communicate, the computer must be outfitted with an infrared port. Most laptop computers ship with an infrared port, and if you need one on a PC, you can purchase an infrared port device that connects to the computer via USB. As always, check the Microsoft HCL before purchasing an infrared device. After you install an infrared device, you'll see a wireless link icon in the Control Panel. If you double-click the wireless link icon, you see a few configuration tabs. On the Infrared tab, shown in Figure 11-6, you have the following options:

- **Display an icon on the taskbar indicating infrared activity** – This option will allow you to see when you are connected to an infrared link and when another computer or device is within your infrared range.

- **Play sound when infrared device is near by** – A tone is played when a device first comes into range of your infrared port.
- **Allow others to send files to your computer using infrared communications** – If you want to let other devices send files to your computer over the infrared link, make sure this item is selected. Otherwise, users will receive an error message stating that "access is denied."
- **Notify me when receiving files** – When this item is selected, a transfer status dialog box appears when files are being received.
- **Default location for received files** – If you choose to receive files, you can configure a default location where those files are stored. Click the Browse button to select the location.

Figure 11-6: Wireless Link – Infrared tab.

On the Image Transfer tab, you can choose to use the wireless link to transfer images from a digital camera to your computer, which is a popular application of infrared technology. Enable the option and choose a default storage location for the picture files as they arrive. Also, notice the Explore location after receiving the pictures option. If you choose this option, the folder in which the pictures are stored will automatically open after you have received the files.

The Hardware tab simply lists the infrared device that is installed. You can see basic information about the device, such as the manufacturer, COM port location, and the current device status. If you select the device in the window and click the Properties button, Device Manager properties or the device will open. You'll see the standard General and Driver tabs, but there is also an Advanced tab that can come in handy. This tab, shown in Figure 11-7, allows you to set the maximum connection rate as well as the COM port. If you are having problems communicating with a certain device, try lowering this value.

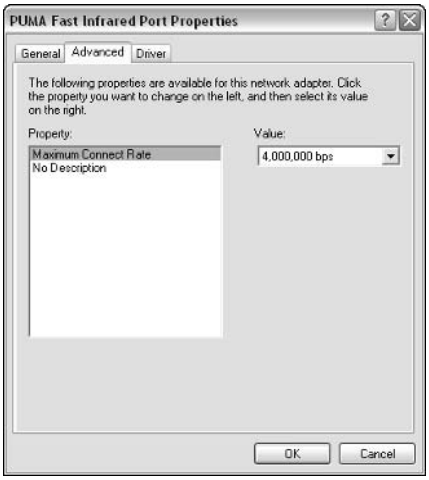

Figure 11-7: Advanced properties tab.

After you have the infrared port working, you can establish two different connections using Windows XP. The first is an infrared link, which allows the computer to communicate with another computer or device over an infrared link. You can connect with another Windows XP computer, a Windows 2000 computer, a Windows 98 computer, or other devices such as PDAs and digital cameras. This kind of link connection allows you to transfer files from computer and/or device to the other computer and/or device.

1. Move the infrared computers or devices so that the infrared receivers are facing each other and are within 1 meter of each other.
2. When the infrared device is detected, an icon appears in your Notification Area and the Wireless Link icon appears on the desktop.
3. Right-click the Wireless Link icon and click Connect. The connection is made and data can now be transferred.

The second kind of connection is an infrared network connection. An infrared network connection provides a direct connection between two infrared computers where the two computers can communicate with each other over the network connection. One computer acts as the host and one computer acts as the guest, whereas the guest computer primarily accesses shared resources on the host computer. This works basically like a direct cable connection. The guest computer provides a username and password, and then can access shared information on the host computer. The guest computer can even map to shared drives and folders. To set up an infrared network connection between two computers, follow these steps:

1. On the host computer, create a user account for the guest computer, if necessary.
2. Align the two computers so that the infrared transceivers are within 1 meter of each other and are pointing at each other.
3. The infrared icon appears in the Notification area and the Wireless Link icon appears on the desktop.
4. To establish the network connection, open Network Connections and click Create a New Connection.
5. Click Next on the Welcome screen.
6. In the Network Connection Type window, choose Set up an advanced connection. Click Next.
7. On the Advanced Connection Options page, choose Connect directly to another computer and click Next.
8. Choose the role of the computer, which is the Host computer in this example. Click Next.
9. On the Connection Device page, choose the infrared port as the connection device. Click Next.
10. In the User Permissions window, choose the accounts that can connect over the infrared port. Click Add if you need to add additional accounts. Click Next.
11. Click Finish. The connection now appears in Network Connections as an incoming connection.
12. On the Guest computer, repeat this same process, but choose the Guest option. When the wizard is complete, both computers can open the connection in the Network Connections folder and click File → Connect to start the infrared network session.

Setting Up an 802.11b Network

Before setting up an 802.11b network, you'll need to decide if you'll use Infrastructure mode or Ad Hoc mode. If you have a few wireless computers that only need to communicate with each other, an access point is not necessary (Infrastructure mode). However, if you have security concerns, you'll need an access point to use the security features that wireless networks provide. When you are shopping for hardware, keep in mind that some access points can also act as routers or residential gateways for Internet access. After you install 802.11b NICs, Windows XP configures the NICs automatically to look for an access point. If no access point is found, Windows XP reconfigures the NICs to use Ad Hoc mode. When the connection to the wireless network is attempted after the NIC is installed, a Connect to Wireless Network dialog box appears, where you can choose the wireless network to which you want to connect and provide the WEP key, if required by the network.

In most cases, Windows XP does a good job of automatically managing the wireless network connections and configurations. However, you can also access the NIC's properties pages and manually configure some settings, if necessary. The following steps show the options.

1. Open Network Connections and right-click the wireless connection. Click Properties.
2. On the Wireless Networks tab, notice that, by default, Windows configures the wireless network settings for you. You see the available networks and the preferred networks. If you need to configure an available network to which you want to connect, select the option in the Available Networks list and click Configure.
3. The Wireless Network Properties dialog box appears. By default, the wireless network key and network authentication are enabled. If you need to enter the network key manually, do so in this dialog box and configure any necessary options. Check the NIC's documentation for details. Under most circumstances, the key is provided automatically, and the options here are grayed out. Notice also that if you are using Ad Hoc mode, you can disable the settings on this tab by choosing the This is a computer-to-computer network; wireless access points are not an option.
4. In the preferred networks list, you can reorganize the list if you have more than one network by using the move up or move down buttons. Place the network that you use most often at the top of the list to speed up your initial access to that network.
5. If you only want to connect to access point networks or you only want to connect to Ad Hoc networks, click the Advanced button at the bottom of the Wireless Networks tab. You see an Advanced dialog box. By default, any available network (access point preferred) is selected. If you want to restrict the connection to only access points or Ad Hoc networks, choose the desired option.

Configuring Network Bridges

A network bridge is a piece of software or hardware that can connect two dissimilar networks or network segments. For example, say that you work in a small office that has both Ethernet and HomePNA, and you want to connect the two networks without having to change them to one or the other. By default, the two networks will not readily communicate with each other, but you can use a Windows XP computer to act as the bridge between the two networks. All communication flowing from the Ethernet and HomePNA networks flows through the bridge, which acts as a translator. This process is invisible to users who do not have to be aware of the bridge at all.

You don't need a bridge if you are using a wireless network and a wired Ethernet network. The wireless access point can connect into the wired hub so that the two networks can communicate.

If you need to configure a network bridge, the configuration in Windows XP is quick and easy. Select the desired Windows XP computer that will act as a bridge, then physically install a NIC from each network. For example, if you want to bridge an Ethernet network with a HomePNA network, install an Ethernet NIC and a HomePNA NIC. Connect the two NICS to their networks, and then you are ready to configure the bridge. However, never bridge a private network with a connection that has a public Internet address. This will open your private network to the Internet. Rather, use ICS to connect the computers to the Internet. Also, do not bridge local networks with VPN connections or dial-up connections.

1. Log on with an administrative account.
2. Access the Properties pages of both connections. Using the Advanced tab, turn off ICS or ICF if they are in use.
3. Open Network Connections. Hold down the CTRL key and click each of the LAN connections you want to bridge so that they are all selected.
4. Release the CTRL key. Then, right-click the selected adapters and click Bridge Connections.
5. Windows XP creates the network bridge. When the process is complete, the bridge appears in the Network Connections folder, along with the LAN connections that now appear under the Bridge category.

The computer that contains the bridge must be turned on at all times for the two network segments to be bridged. If the bridge is offline, the segments will not be connected. You can add or remove connections to the bridge at any time by right-clicking the bridge icon and clicking Properties. You can have only one bridge on a Windows XP computer, but the bridge can support multiple connections (up to 64). You can easily add or remove connections from a bridge by right-clicking the bridge, clicking the connection, and clicking Remove from Bridge or Add to Bridge.

Managing Connections

After the NIC is installed, it appears in the Network Connections folder, as shown in Figure 11-8, as a Local Area Connection. You'll also see any other connections that are currently configured on the computer, such as dial-up and broadband connections.

Figure 11-8: Network Connections folder.

If you right-click the connection and click Properties, you can access the properties dialog box for the Local Area Connection. The main tab from which you can configure items is the General tab, shown in Figure 11-9. As the figure shows, you can click the Configure button to configure and troubleshoot the NIC itself. This feature simply opens Device Manager properties for the NIC. In the middle of the window, you see a list of services and protocols that are bound to the NIC. Common examples you might see here are Internet Protocol (TCP/IP), Client for Microsoft Networks, and File and Printer Sharing for Microsoft Networks. These services and protocols are bound to the NIC, which means the NIC uses these protocols and services for communication on your network. However, depending on the needs of the network, you may need to bind other protocols and/or services, as well. For example, say that NetWare is in use in your network. In this case, you may need to add the NWLink protocol or Services for NetWare. In small networks, you might also need the NetBEUI protocol (although use of NetBEUI has been widely replaced by TCP/IP). If you do, in fact, need to add a service or protocol, you can easily do so. Just follow these steps:

1. To add a protocol or service, click the Install button on the General tab.
2. In the Select Network Component Type dialog box, shown in Figure 11-10, choose Client, Service, or Protocol. Click Add.
3. In the Selection List that appears, select the client, service, or protocol that you want to install. If you have an installation disk for the client, service, or protocol, click the Have Disk button and follow the instructions that appear. Otherwise, click OK.
4. The new client, service, or protocol is installed.

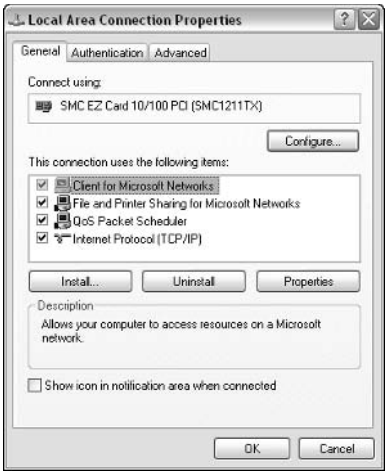

Figure 11-9: General tab.

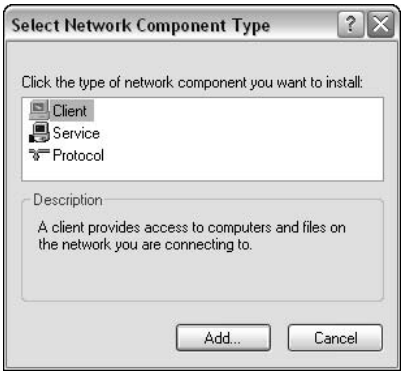

Figure 11-10: Network Component Type.

Viewing Connection Information

Windows XP gives you a quick and easy way to see what is going on with any particular network connection. Simply double-click the Local Area Connection icon to get immediate information about the connection. This opens the Status dialog box, shown in Figure 11-11, where you can see the following:

- If the connection is actually connected
- The duration of the connection
- The connection speed
- The connection's activity

You can also access the Properties dialog box and disable the connection.

Figure 11-11: Status dialog box.

If you click the Support tab, shown in Figure 11-12, you can immediately gain information about the connection, such as the IP address, subnet mask, and default gateway, rather than having to use Ipconfig.exe. Notice that you have an option to Repair the connection. If the connection is not working or seems to be misconfigured, you can click this button, and Windows XP performs a few different actions. Windows XP tries to obtain a new IP address from the DHCP server. It also flushes the Address Resolution Protocol (ARP), NetBIOS, and Domain Name System (DNS) caches. Then, the computer tries to reregister with WINS and DNS servers on the network.

Figure 11-12: Support tab.

If you click the Details button, the Network Connection Details dialog box appears, shown in Figure 11-13, where you can also gain additional information, such as the physical address of the NIC and the addresses of the WINS and DNS servers on the network.

Figure 11-13: Network Connection Details.

You can easily manage the local area connection in the same manner by right-clicking the local area connection icon and selecting from different choices that appear, such as the following:

- **Disable** – This stops the connection from working; however, it does not uninstall the NIC or remove any drivers. This feature is a great way to stop network connectivity while a computer is being configured or for troubleshooting purposes.
- **Status** – This gives you the same Status dialog box that appears if you double-click the connection.
- **Repair** – This is the same repair option that appears on the Status dialog box.
- **Bridge Connections** – See the section *Configuring Network Bridges* earlier in this chapter for bridge connections of different topology types.

Configuring TCP/IP

As you learned earlier in this chapter, Windows XP uses APIPA, which enables it to automatically configure TCP/IP for a connection to your LAN. This is great news for workgroup configurations, because it keeps you from having to manually configure TCP/IP. Still, for the curious, you can manually configure an IP address, subnet mask, and default gateway, if necessary or desired. You don't have to do anything to configure TCP/IP when APIPA or DHCP is used, which is most of the time. The only time you need to configure an IP address and subnet mask is if you want the computer to have a static configuration. The following steps show you the configuration for APIPA or DHCP:

1. Click Start → Control Panel → Network Connections.
2. Right-click the Local Area Connection and click Properties.

3. On the General properties tab, select Internet Protocol (TCP/IP) in the list and click the Properties button.
4. On the Internet Protocol (TCP/IP) Properties General tab, ensure that the Obtain an IP address automatically and the Obtain DNS server address automatically radio buttons are selected. After these are selected, Windows XP Professional looks for a DHCP server. If no DHCP server is found, an APIPA address is configured.
5. If you want to use a static configuration, choose the Use the following IP address option, and enter the addressing information, as required (shown in Figure 11-14). Again, make sure you need to use a static IP address before using this configuration.

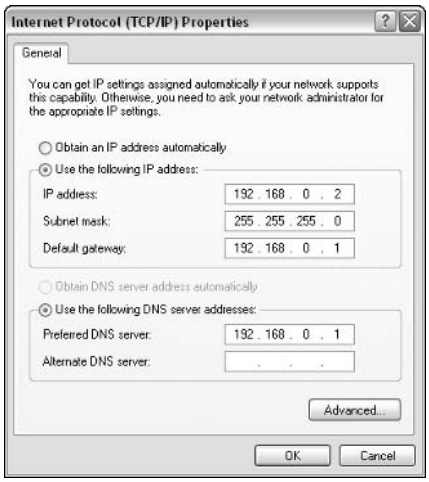
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 0 . 2
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 0 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 192 . 168 . 0 . 1
Alternate DNS server:
Advanced...
OK
Cancel

Figure 11-14: General tab.

6. If you click the Advanced button, you can configure some additional TCP/IP settings. On the IP Settings tab, you can add, edit, and remove IP addresses and default gateways for the computer, as shown in Figure 11-15. This feature enables you to use multiple IP addresses and default gateways on the same computer. This feature can be especially helpful in the case of a laptop computer that you move from one network to the next.
7. On the DNS tab, you can enter the additional addresses of other DNS servers that can be used. You can also determine how DNS handles names that are unqualified. The default settings are typically all you need here.
8. On the WINS tab, you can add the names of WINS servers, if they are still in use on your network, and you can enable LMHOSTS lookups.

Figure 11-15: IP Settings tab.

9. On the Options tab, shown in Figure 11-16, you have a TCP/IP filtering feature. If you select TCP/IP filtering on this tab and click Properties, you see a simple TCP/IP Filtering window. TCP/IP filtering functions like a miniature firewall where you can allow or deny traffic on desired TCP and UDP ports, or on a protocol basis. This setting is not needed in a network environment where a firewall is in use, but it can be helpful in a workgroup setting if you want to place some IP restrictions on the computer's network adapters. Click OK and OK again after you have configured these options.

Figure 11-16: Options tab.

Troubleshooting Connections

Troubleshooting is one of those unfortunate facts of life in the computer world, and network connections between computers is certainly no exception. A number of potential problems can occur, but overall, a thoughtful look at the connection will typically give you the solution you need.

In terms of connections, you are most likely to experience either a slow network connection, or a connection that simply doesn't work at all. Troubleshooting slow network connections can be a complicated task, mainly because there are so many different problems that can affect the speed of the connection. From network bottlenecks to various hardware problems, slow connections are a common difficulty in any networking environment. However, the client, services, and protocols that are installed on the local NIC can also cause slow connections. The more clients, services, and protocols that you have installed, the more work the NIC must do to filter through these items to determine which ones need to be used at any given time. The key point here is simply this – install what you need, but do not install services, clients, or protocols that you are not using. Having these items available when they are actually not needed does nothing but increase the odds that your network connectivity will work more slowly.

If you simply can't connect, which will more often be the case, first make sure the computer is connected to the network. You would be surprised at the hours of troubleshooting that are wasted simply because the computer isn't connected to the hub. So, start with the obvious and make sure the computer is connected. Next, check the IP address and subnet mask. If you are using APIPA, make sure that the IP properties allow the computer to gain an IP address automatically. (See the previous section *Configuring TCP/IP* for details.) Next, restart the computer. Networking software, like any software, can sometimes get fouled up, so a simple restart might fix the problem. Also, try the Repair feature for the connection, found by double-clicking the connection in Network Connections.

If you continue to have problems, you might want to use some helpful TCP/IP troubleshooting tools, which can give you valuable information about the status of your network connection. The following sections show you how to use some helpful tools that are available to you.

Ping

Ping is a network connectivity tool that allows you to test network connectivity against another computer, or even your computer's local network adapter card. Ping sends an ICMP echo request to the desired IP address or name and provides you with a response as to whether the ping was successful or the host was unreachable. At the Windows XP Professional command prompt, type **ping ipaddress**, such as **ping 10.0.0.1**, or you can ping via name such as **ping computer7**. You can also perform a loopback test against your computer's network adapter card by typing **ping 127.0.0.1**. To see all of ping's options, type **ping -?** at the command prompt. Figure 11-17 shows you an example of a successful ping test.

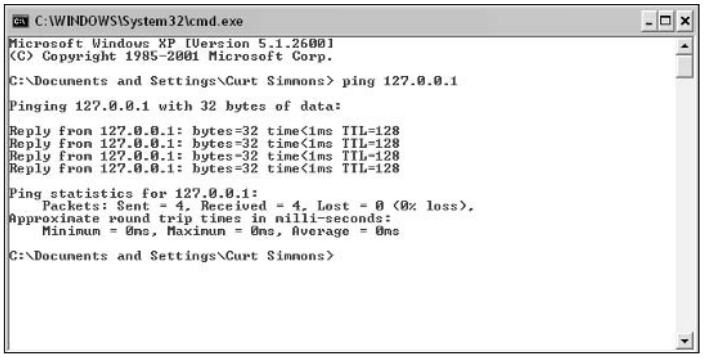
C:\WINDOWS\System32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\Curt Simmons> ping 127.0.0.1
Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Ping statistics for 127.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\Documents and Settings\Curt Simmons>

Figure 11-17: A successful ping test.

Ipconfig

Ipconfig reports the IP configuration of your computer. At the command prompt, simply type **Ipconfig** and press Enter. You'll see the IP address, subnet mask, and the default gateway for the local area connection. If you type **Ipconfig /all**, you can see a more detailed list of the computer's IP configuration, as shown in Figure 11-18. Ipconfig also gives you some additional command line parameters, which you can review by typing **Ipconfig /?**.

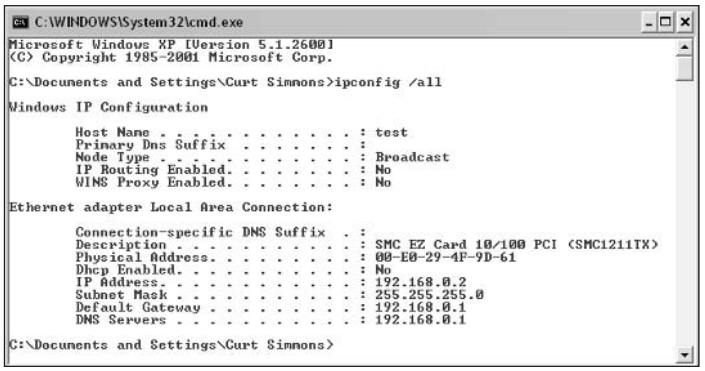
C:\WINDOWS\System32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\Curt Simmons>ipconfig /all
Windows IP Configuration
Host Name . . . . . : test
Primary Dns Suffix . . . . . :
Node Type . . . . . : Broadcast
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . :
Description . . . . . : SMC EZ Card 10/100 PCI (SMC1211TX)
Physical Address. . . . . : 00-E0-29-4F-9D-61
Dhcp Enabled. . . . . : No
IP Address. . . . . : 192.168.0.2
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
DNS Servers . . . . . : 192.168.0.1
C:\Documents and Settings\Curt Simmons>

Figure 11-18: Ipconfig.

Netstat and Nbtstat

Netstat is a connectivity tool that displays all connections and protocol statistics for TCP/IP. You can use a number of switches with Netstat, which you can view by typing **netstat ?**. For listing, you can view the protocol local address, foreign address, and the current state of the connection.

Similarly, Nbtstat is helpful in cases where you need to troubleshoot NetBIOS naming and connectivity problems. This tool checks the status of NetBIOS over

TCP/IP connections, and can give you information about the NetBIOS caches, the current sessions, and statistics. You can view a number of switches by typing **nbtstat** at the command line. The –RR switch (ReleaseRefresh) was first introduced in Windows 2000 to send name release packets to WINS and then perform a refresh.

Tracert

Tracert is a simple utility that traces the route from one host to another. You can trace routes over the local network, or even to a Web site, such as `www.curtsimmons.com`, as shown in Figure 11-19. You can also view a listing of tracert switches by typing **tracert** at the command line.

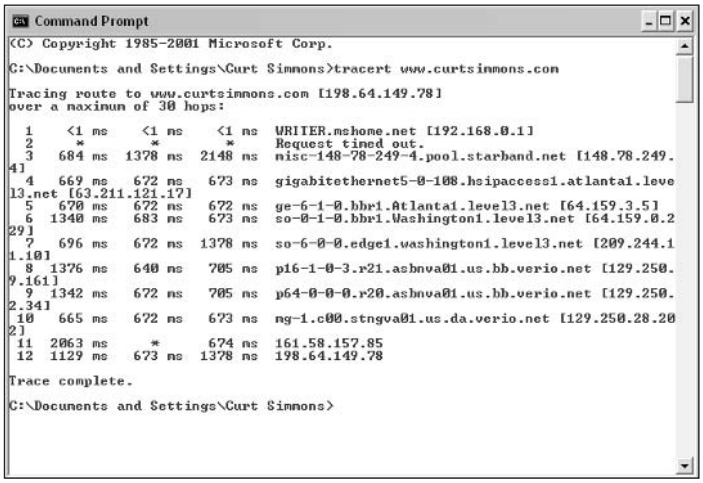
Command Prompt
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\Curt Simmons>tracert www.curtsimmons.com
Tracing route to www.curtsimmons.com [198.64.149.78]
over a maximum of 30 hops:
1 <1 ms <1 ms <1 ms WRITER.mshome.net [192.168.0.1]
2 * * * Request timed out.
3 684 ms 1378 ms 2148 ms misc-148-78-249-4.pool.starband.net [148.78.249.4]
4 669 ms 672 ms 673 ms gigabitethernet5-0-108.hsipaccess1.atlanta1.level3.net [63.211.121.17]
5 670 ms 672 ms 672 ms ge-6-1-0.bbr1.Atlanta1.level3.net [64.159.3.5]
6 1340 ms 683 ms 673 ms so-0-1-0.bbr1.Washington1.level3.net [64.159.0.229]
7 696 ms 672 ms 1378 ms so-6-0-0.edge1.washington1.level3.net [209.244.11.101]
8 1376 ms 640 ms 705 ms p16-1-0-3.r21.asbnva01.us.bb.verio.net [129.250.9.161]
9 1342 ms 672 ms 705 ms p64-0-0-0.r20.asbnva01.us.bb.verio.net [129.250.2.34]
10 665 ms 672 ms 673 ms ng-1.c00.stngva01.us.da.verio.net [129.250.28.202]
11 2063 ms * 674 ms 161.58.157.85
12 1129 ms 673 ms 1378 ms 198.64.149.78
Trace complete.
C:\Documents and Settings\Curt Simmons>

Figure 11-19: Tracert.

Pathping

First appearing in Windows 2000, Pathping combines the functionality of ping and tracert. You can ping an address or DNS name and see the actual route of the ping, including percentage information on the packets lost. This troubleshooting tool can be useful in a large network environment experiencing connectivity problems. Pathping can help you isolate where the connectivity problem resides so that it can be repaired.

Route

The Route command can be used to view local routing tables and change them if they contain errors. This troubleshooting tool can be used to verify correct routing information and correct IP routing data in the host's routing table. You can view all the switches available for Route by typing **route** at the command prompt.

Nslookup

Nslookup is used to look up IP address-to-DNS mappings in a DNS database. Of course, this tool only works in domain environments where DNS is in use. You can get the DNS server's name and IP address by simply typing **nslookup** at the command prompt. To see a listing of available switches, type **nslookup** so that the DNS server is found, and then type **?** to see the options available to you.

Chapter 12

Networking in Windows Networks

IN THIS CHAPTER

- Getting to know Windows domains
- Joining a domain
- Using domain resources
- Disjoining from a domain

WINDOWS 2000 PROFESSIONAL IS designed to be a diverse operating system. You can easily use Windows 2000 Professional in a workgroup environment, and it can provide the features and functions you need for workgroup networking. However, Windows 2000 Professional is also built to function in a Windows domain environment, and it contains all of the necessary software and functions to take advantage of what a Windows domain has to offer. This chapter takes a look at Windows 2000 Professional's place in a Windows domain and the configuration of Windows 2000 Professional for domain networking.

Getting to Know Windows Networking

For all the features a Windows workgroup provides, there is one major problem with workgroups: a lack of centralized security and management. In a workgroup environment, each individual user is responsible for administering and managing his or her computer. This, for the most part, is fine in a small workgroup, but imagine a network of thousands of computers where no centralized security and management features are in place. Certainly, such a network would pose tremendous security and management problems.

To solve this problem, larger Windows networks use a domain model, where collections of computers are organized for management and administrative purposes. In such a model, users log on to a Windows 2000 or later authentication server, which authenticates the user for network access. Under this model, security is centralized, and network administrators can manage network computers and users through a centralized group policy.

To get a focus on Windows domain networking, you need to understand a few networking concepts. These concepts apply to Windows 2000 and later networks and can certainly help you understand how a larger Windows network functions.

Windows Domains

A *domain* is a logical grouping of users, computers, and resources that makes up a security and administrative boundary. The domain is not a physical entity – it doesn't identify the actual network topology or physical locations of the network, but it defines a boundary. A domain can be a grouping of users, computers, and resources in one office building containing a few hundred users, or it can be a grouping of users, computers, and resources spread over several offices around the globe containing thousands of objects. In the same manner, the domain serves as a security boundary. Security policies are applied to the domain, and desired security standards can be used across the entire domain. So, the domain is used to define both a security and administrative boundary.

In a Windows 2000 network, all domain information is held in a central repository – the Active Directory. Network data and configuration, along with user, group, and resource data are all found in the Active Directory and are replicated to domain controllers throughout the domain. Windows 2000 networks are built on the Domain Name System (DNS). In the past, Windows networks used NetBIOS as the naming scheme, but DNS is the most scalable naming system in existence (it holds the entire Internet), and Windows 2000 is completely integrated with DNS. Because of this, the Windows namespace, or the naming area that can be resolved, is entirely built on DNS. Therefore, Windows 2000 domain names are DNS names. For example, ammacom.com could be the name of an Internet Web site, but it is also a domain in a Windows 2000 network. `Juser@ammacom.com` is an Internet e-mail address, but it is also a username in a Windows 2000 network. As you can see, the Windows 2000 namespace is seamless with Internet names – simply because they are all built on the same naming system – DNS.

Because the Windows 2000 network is built on the DNS namespace, all domains in a Windows 2000 network follow the DNS naming structure. As I mentioned, a company called Ammacom could implement the Active Directory using their company name for the namespace. As such, the first domain that is created, called the forest root domain, could be named ammacom.com. All other network names are built from this root domain name.

Understanding Windows Sites

As mentioned in the previous section, a domain is a logical grouping of computers, users, and resources for administrative and security purposes. A site, on the other hand, is a physical grouping of computers, users, and resources. A site is not a part of the Active Directory namespace, and as an administrator, you typically do not work directly with sites. Domains use sites to manage traffic. For example, say a domain is based at your company headquarters in Dallas. All users, computers, and

Trusts Between Windows Domains

For users in one domain to access resources in another domain on the same network, the two domains have to trust each other. In Windows NT networks, trust relationships between domains can be a real headache. One domain could be the trusting domain while another domain could trust the first domain, but some domains only trust while some are trusting — and the entire network could become one confusing access problem if we are not careful. Trust relationships in Windows 2000 networks have been greatly simplified. In fact, trust relationships between domains within the same tree are automatically configured as two-way transitive trust relationships. This means that DomainA and DomainB both trust each other, and should there be a DomainC that DomainB trusts, DomainA automatically trusts that domain as well. This design removes the trust relationship problems between domains in the same tree.

resources are physically located in that single location. To the Active Directory, the offices make up one site because they are all contained on well-connected subnets. In other words, there are no WAN links. The site, then, defines the geographic locations of the domain. In many cases, there may simply be one site.

The Active Directory then uses a site for each physical location and the information you provide it to determine the speed, reliability, and availability of the WAN links that connect these sites. To administrators and domain users, it appears as though everyone is located in one place, but in reality, the users, computers, and resources are spread out over several different geographic locations.

How does the Active Directory determine these sites? It does so with the information that administrators provide. The key point to keep in mind is that the Active Directory considers a site to be a collection of well-connected subnets. Simply put, the Active Directory considers a site a location that has fast and readily available bandwidth, such as a typical LAN. For the Active Directory to manage traffic over WAN links, the Active Directory must know what sites exist and have information about the speed and availability of the WAN links between them.

Understanding Organizational Units

So far, you have learned that domains are a logical grouping of computers, users, and resources. Domains use sites to determine the physical location of those computers, users, and resources and to manage traffic. Under the Windows 2000 design, a domain is essentially unlimited in size. For example, the domain could contain a few thousand objects or, potentially, hundreds of thousands of objects. In larger domains, the problem becomes management. In other words, in a large domain with hundreds of thousands of objects, how do you organize the domain so that different administrators manage different portions of the Active Directory, or even different groups of users, computers, and resources? The answer is the organizational unit (OU).

The organizational unit is simply a container within Active Directory, much like a folder, where different objects can be stored. Certain administrators can be delegated control over the different OUs, as needed. This design gives networks a lot of flexibility without the expense and difficulty of configuring and managing multiple domains, as in the following examples:

- A network could organize all users into one OU that is managed by certain administrators, or all printers into one OU that is administered by certain administrators.
- A network could organize its domain by its company needs. For example, there could be a marketing OU and a sales OU. Different administrators could manage the OUs, including all of the users and resources for those company divisions.
- A network could be organized by location. There could be a Paris OU or a Dallas OU, and administrators in those locations could manage the users and resources, while still belonging to a single domain.

As you can see, a number of different options can be configured, and they are all based on the organizational needs of a particular network. However, aside from basic organization, you can accomplish some additional tasks with OUs. First of all, OUs serve as an organizational boundary, but they also serve as a security and management boundary. Within an OU, an administrator can place different restrictions on resources and users, and even use a group policy at the OU level. With delegation of control, one administrator can manage a particular OU, but have no administrative power over another one. OUs are a way to subdivide a domain into more manageable pieces.

However, there are two important points to keep in mind about the OU:

- OUs are invisible in terms of DNS. Say you have a resource in an OU called resources, located in the xprod.com domain. The resources are still found in the xprod.com domain — not resources.xprod.com.
- OUs are specific to the domain and can only contain objects held within that domain. An OU cannot contain any resources that reside in another domain.

As network administrators and planners determine the need and use of organizational units, it is important to keep in mind that you can have as many OUs as you need, and OUs can be nested, which means they can reside within other OUs.

Windows XP Professional does not have the capability to manage any of the domain, site, or OU features discussed in these sections. All of these features are managed by the Active Directory, which only runs on Windows 2000 and

later domain controllers. Windows XP Professional, however, can function as a print server or file server in a Windows network.

Joining a Domain

Windows XP Professional has the necessary software to join a Windows domain. Before attempting to join a domain, however, you must take care of a few tasks first. To join a domain, your computer must have a computer account with a domain controller on the domain, and you must have a valid username and password on the network. A network administrator must configure these items. In most cases, your computer must be configured to obtain an IP address automatically in TCP/IP properties so that a Dynamic Host Configuration Protocol (DHCP) server can manage your computer's IP address (see Chapter 11 for details). Finally, your computer must be configured with a network adapter card and be physically connected to the network.

Only Windows XP Professional computers can join a domain. Windows XP Home edition does not have domain-networking capabilities.

When you are ready to join a domain, Windows XP provides a helpful wizard that walks you through the process. The following steps show you how:

1. Log on to the Windows XP computer with an administrator account. Click Start → Control Panel → System.
2. In the System Properties dialog box, click the Computer Name tab. As you can see in Figure 12-1, the Computer Name tab gives you a computer description and Network ID and Change buttons.
3. Click the Network ID button. This opens the Network Identification Wizard that guides you through the rest of the process. Click Next on the Welcome page that appears.
4. The next window, shown in Figure 12-2, asks you if the computer will be a part of a business network (domain) or a home or small office computer (workgroup). Select the business network option and click Next.
5. In the Connecting a Network page, select the My company uses a network with a domain option and click Next.

Figure 12-1: Computer Name tab.

6. The next page tells you about the username, password, domain name, and possibly computer name information that you will need. Click Next after you have read the page.
7. On the User Account and Domain Information page, shown in Figure 12-3, enter your username, password, and domain name. Keep in mind that the password is case-sensitive. Click Next.
8. You may also be asked to verify the computer and the domain. If so, enter the information in the provided page and click Next.

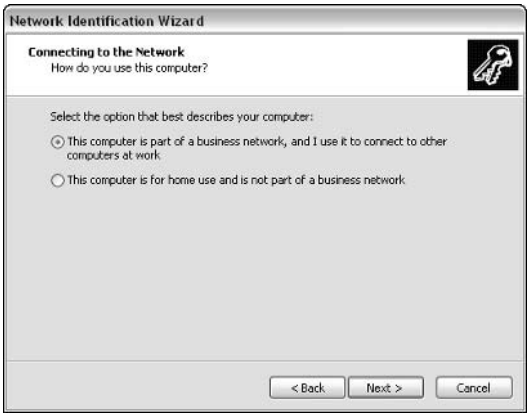
Network Identification Wizard
Connecting to the Network
How do you use this computer?
Select the option that best describes your computer:
This computer is part of a business network, and I use it to connect to other computers at work
This computer is for home use and is not part of a business network
< Back
Next >
Cancel

Figure 12-2: Connecting to the network.

Network Identification Wizard
User Account and Domain Information
A user account gives you access to files and resources on a network.
Type your Windows user account and domain information. If you do not have this information, ask your network administrator.
User name:
Curt Simmons
Password:
Domain:
TEST
< Back
Next >
Cancel

Figure 12-3: Enter your domain account information.

9. In the User Account window, you can choose to add the domain user account to the local user accounts so that the user can gain access to local system resources. This feature enables you to limit what the user can do on the local machine or even make the user account a local administrator account. For example, I am logging on to a domain using my username, csimmons. However, I also want administrative control over my local computer. So, I simply agree to add the new user account to the local computer. I can then log on locally with my administrative account and make this domain account a local administrator account. Now, I have one login for the domain that allows me to completely manage my local computer as well. Make a selection and click Next.
10. If you chose to add a new user account, choose the level of permission that you want to assign, and click Next.
11. Click Finish. A prompt appears for you to restart your computer.

The Network Identification Wizard helps you walk through the steps of joining a domain, but you can do so more quickly by clicking the Change button on the Network Identification tab of System Properties. This option basically distills the wizard pages to a single dialog box, shown in Figure 12-4, where you enter the computer name and (if necessary) click the option to log on to a Windows domain, and enter the domain name. Simply click OK to join the domain and enter the username and password for your domain account when prompted. You'll need to restart your computer after you complete the joining process.

Figure 12-4: Computer Name Changes option.

Logging On to a Domain

After you join a Windows domain, you can log on to the domain and begin using domain resources. Before you log on to the domain, however, you should note that changes will occur to your Windows XP computer after you configure it for domain access. Some of the features of Windows XP that you can use in a small office network or without networking at all are simply incompatible with domain networking, so be sure to take note of the following issues. The issues are created purposefully and are not something you can directly work around:

- Fast User Switching does not work when you log on to a domain. Because Fast User Switching works on a local account basis and domain connectivity functions by server authentication, Fast User Switching is not available.
- No password hints are available for your domain password, should you forget it.
- Automatic logon is not supported. You can configure automatic logon by editing the registry, but this constitutes a serious security breach because anyone can use your computer and gain access to the network. This registry hack is not recommended and is most likely unwanted by your network administrators.
- The Log Off and Shut Down options look different. They do the same thing, but they look like the standard logoff and shutdown options you see on Windows 2000 Professional.

- The Start menu displays your name, as stored in your domain user account instead of your local administrator account.
- The CTRL+ALT+DEL command no longer directly opens the Task Manager. Instead, you see a Windows Security dialog box, where you can choose to Lock the Computer, Log Off, Change your Password, or access Task Manager.
- The Users Interface in the Control Panel changes from the graphical local accounts option you typically see. The functionality remains the same, but the graphical interface changes.
- Internet Time in the Date and Time Properties dialog box does not work. Time synchronization is handled by the Windows server instead of an Internet timeserver.
- Simple File Sharing does not work. By default, Windows XP uses Simple File Sharing (see Chapter 15), but when you configure Windows XP for use on a Windows domain, Simple File Sharing is disabled so you can take full advantage of NTFS permissions at the domain level.

Refer to Chapter 15 for more information on Simple File Sharing.

When you are ready to log on to the Windows domain, and you have restarted your computer after configuring to connect to a domain, you can simply log on to Windows XP as you normally would. However, you'll notice that the Welcome screen is gone and you have to press CTRL+ALT+DEL to see a standard Windows logon dialog box where you have to type your username and password. You must use your domain username and password — not a local Windows XP username and password. Otherwise, you'll see an authentication failure. Because Windows XP is now contacting a Windows domain controller to authenticate your logon and your local user accounts database, you must provide a network username and password.

In case you're wondering, CTRL+ALT+DEL is a security measure. Domain configuration requires you to press these keys to access the Windows logon dialog box. CTRL+ALT+DEL is a common keystroke that can halt malicious code that could be running on your system, such as a Trojan Horse that can steal your username and password. Winlogon.exe is the only program that can run after a CTRL+ALT+DEL keystroke on Windows.

Locating Resources on a Domain

After you have logged on to a domain, you can begin to access resources that the domain provides. I should note upfront that domain access doesn't mean you'll be able to access anything you might want. Rather, you'll be able to access those resources to which you have been given permission. With NTFS security in effect on the domain, you may be able to freely access some resources, be denied access to some, and have limited access to others. For example, you might be able to open certain shared folders and read their contents, but be unable to alter anything. So, don't assume the network is yours for the taking.

So, once you log on to the domain, how can you begin accessing those resources? There are a few different ways to access resources and a few ways that can make your life easier with resource access. The following sections explore those features.

Using the UNC Path

You can access a network resource using the Run dialog box, just as you can use the Run dialog box to access a local resource on your computer, such as a folder. Click Start→Run and use the Universal Naming Convention (UNC) path to access the resource. The UNC path for accessing network resources is `\\servername\sharename`, where *servername* is the name of the server or computer on the network that provides the resource, and *sharename* is the name of the shared resource. For example, if you wanted to access a folder called cmpydocs on a server named server1, the UNC path you should type in the Run dialog box is `\\server1\cmpydocs`, as shown in Figure 12-5. However, you are not limited to using the Run dialog box. In fact, you can use any Explorer window in Windows XP, including Internet Explorer, to immediately jump to a network resource using the UNC path, as shown in Figure 12-6. Using the UNC path, you can quickly move to shared resources on your network from essentially any folder or location on Windows XP. However, you have to know the server's name and the resource's name to access them using UNC. Many times, you will not know these names initially, so you'll have to resort to browsing or searching the Active Directory, as described in the next two sections.

Figure 12-5: You can use the Run dialog box to access a UNC path.

Figure 12-6: You can also use the Address line in any Windows Explorer window or Internet Explorer to access a UNC path.

Browsing for Resources

You can browse for network resources using My Network Places, which you'll find on the Start menu. My Network Places shows you all of the shared folders and/or computers on your network. You can double-click a computer or shared folder to access resources, as shown in Figure 12-7. My Network Places will show you local resources as well as Internet resources for which you have added a network place (explored in the *Creating a Network Place* section later in this chapter).

Browsing is a great way to look for resources if the domain is small or you are using a workgroup configuration. The problem, though, is that many domains contain thousands of computers and thousands of shared resources, and browsing simply leaves finding resources to chance. You have to accidentally locate what you might need by browsing, and in a large network, browsing simply isn't practical. In this case, you'll need to search the Active Directory to locate what you need, and the following section shows you how to do that.

Searching the Active Directory

The Active Directory, as mentioned earlier in this chapter, runs on Windows domain controllers and provides a central directory for the network. Everything from user accounts to printers to shared folders is stored in the Active Directory. Even though you can browse for the resources that you want, you can more easily search the Active Directory and locate items quickly.

The Active Directory is easy to search because you can search for items based on attributes. For example, say you need to locate a printer that prints color. Your

network has a number of shared printers, so to ensure that you find the right one, you can query the Active Directory to find a printer that prints in color. This prevents you from having to manually locate the right printer.

Figure 12-7: My Network Places.

The Active Directory uses Lightweight Directory Access Protocol (LDAP) for searching the Active Directory. LDAP is an industry standard used in many different kinds of networks and search engines. It is fast, effective, and flexible, which is why Windows networks now use LDAP.

To search the Active Directory, follow these steps:

1. Open My Network Places.
2. Under Network Tasks in the left pane, click Search Active Directory. This option only appears if your computer is part of a domain.
3. The Find Users, Contacts, and Groups window appears. In the Find box, select what you want to search for, such as Shared Folders.
4. Complete the fields required for starting a search, which will vary depending on what you are looking for. For example, you can search for a printer by name, location, or model. Enter your search information and

click Find Now. The results appear in a pane that unfolds at the bottom of the window. Simply double-click the shared resource that you want to access.

5. Depending on the resource that you are searching for, you can also search for the resource based on features or other information. For example, you can search for a shared printer based on its characteristics by clicking the Features tab. This allows you to search for color printers, printers that staple, and so on. If these options do not give you the results you want, try the Advanced tab, where you can choose fields, conditions, and values for the search. For example, you could choose Pages Per Minute in the Field list and Greater Than Or Equal To in the Condition list, and then type a number in the Value list, such as 15, to obtain a list of printers that can print at least 15 pages per minute. If you select multiple criteria on the various tabs, your search will reveal printers that meet all the conditions you have specified.

Creating a Network Place

After you locate a shared resource on the network through either browsing or searching the Active Directory, you may want to create a network place or map a network drive to that resource. Network Places and mapped network drives are essentially the same thing; they give you access to network resources through an icon on your computer so that you do not have to browse or search for those resources each time you want to use them. For example, say you locate a shared folder that contains a number of resources you will access regularly. This is a perfect candidate for a network place or a mapped network drive so that you will be able to access the resource easily, just as if it were stored locally. The following steps show you how to configure a network place:

1. Open My Network Places.
2. Click the Add a Network Place link under Network Tasks. This opens the Add Network Place Wizard. Click Next to move past the opening page.
3. You have the option of signing up for online storage with a storage provider, but to create a network place that points to a location in your domain or your workgroup, click Choose Another Network Location, and then click Next.
4. On the What Is The Address Of This Network Place page, type the network address, or click the Browse button to open the Browse For Folder dialog box.
5. If you opened the Browse For Folder dialog box, browse to the network resource for which you want to create a network place, as shown in Figure 12-8. You'll want to expand the Entire Network link, expand

Microsoft Windows Network, and then expand your domain or workgroup name. The network computers will be listed. Expand a computer and a drive, and then select a folder. Click OK. The address appears in the Internet Or Network Address dialog box. Click Next.

Browse For Folder
Select the network location you want to connect to:
My Network Places
Entire Network
CD Drive (E) on Curt's Writing Machine (Writer)
mac on Curt's Writing Machine (Writer)
Microsoft Money on Curt's Writing Machine (Write
My Web Sites on MSN
SharedDocs on Curt's Writing Machine (Writer)
Transfer on Test
www.curtsimmons.com
Make New Folder
OK
Cancel

Figure 12-8: Browse for the network folder.

6. On the What Do You Want To Name This Place page, type a name that will identify the Network Place for you. Click Next, and then click Finish.

The Network Place now appears in your My Network Places folder, as shown in Figure 12-9. You can drag the icon to your desktop, another folder, or even the Start menu for easier access to the network resource.

Figure 12-9: You can now directly access the Network Place.

Mapping a Network Drive

You can also map a network drive. When you map a network drive, you assign a drive letter to a network computer, disk, shared folder, printer, or other resource. You can then use the mapped network drive just as if it were a local drive on your computer. There is no benefit to using a mapped network drive over a network place. Mapping a network drive is an older technology that network places essentially duplicates, but you are free to create them as you want. Just follow these steps:

1. Open My Network Places.
2. Click Tools → Map Network Drive.
3. In the Map Network Drive dialog box, choose a drive letter from the Drive list that will represent the network location. Drive letters that are already in use will not be displayed. Next, use the Folder box to enter the network path in the form `\\servername\sharename`, shown in Figure 12-10, or click Browse to navigate to the resource. Keep in mind that *sharename* refers to the shared folder's name, not necessarily the name of the network place. Click Finish when you're done.

Map Network Drive
Windows can help you connect to a shared network folder and assign a drive letter to the connection so that you can access the folder using My Computer.
Specify the drive letter for the connection and the folder that you want to connect to:
Drive:
Z:
Folder:
\\Writer\SharedDocs
Browse...
Example: \\server\share
Reconnect at logon
Connect using a different user name.
Sign up for online storage or connect to a network server.
< Back
Finish
Cancel

Figure 12-10: Assign a drive letter and folder name.

The drive now appears in My Computer under the category of Network Drives, as shown in Figure 12-11. You can create a shortcut to the drive and place the shortcut anywhere on your computer. You can remove a network drive by simply right-clicking the drive and clicking Disconnect. You can also remove a network place by right-clicking the icon and clicking Delete.

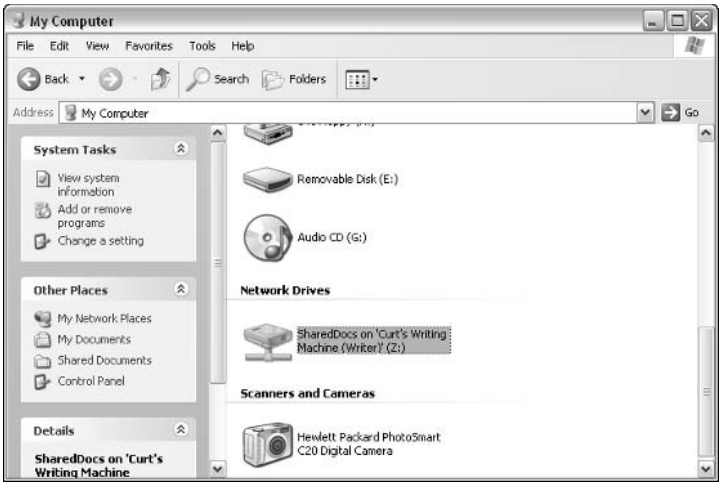

Figure 12-11: The mapped drive appears in My Computer.

Disjoining from a Domain

There may come a time when you need to disjoin your computer from a domain. This occurs when the computer will no longer be used in a domain environment. In this case, you need to essentially tell Windows XP that it is no longer a part of the domain. Follow these steps to disjoin from a domain:

1. Log on to the local computer as a user with administrative privileges.
2. Open System in the Control Panel, and select the Computer Name tab.
3. Click the Change button. If the Change button is grayed out, you need to log on with a local administrator account.
4. In the Computer Name Changes dialog box, choose Workgroup in Member Of, and then type the name of the workgroup. Click OK.
5. A second Computer Name Changes dialog box appears. You must provide the username and password of a domain account that has the credentials to remove a computer from the domain. See a domain administrator for assistance if necessary.

Chapter 13

Remote Networking

IN THIS CHAPTER

- Using Virtual Private Networking
- Working with Remote Desktop
- Running Remote Assistance

As networks have grown and developed over time, the concept of being able to remotely network to other computers has become very important – after all, just look at the world's largest network, the Internet. From a Windows XP networking point of view, the option to remotely network still carries the same importance, and Windows XP gives you a few options that can really help. As in previous versions of Windows, XP supports Virtual Private Networking (VPN), but it also contains two additional remote networking features: Remote Desktop and Remote Assistance.

Understanding Virtual Private Networking

Two of the major problems with networking remotely are security and expense. To network remotely on the same network, you have to use a wide area network (WAN) consisting of expensive networking topologies. If you network across public networks, such as a phone line or the Internet, security becomes a major issue. Microsoft has provided a solution to both of these problems through Virtual Private Networking. When you use a VPN, Windows XP creates a secure connection to remote computers across a public network. This virtual network allows the connected users to interact as if they were all on the same private network.

For the connection to act like a point-to-point link, such as what you would establish when communicating with a computer on a private network, the network data has to be encapsulated so that it can travel the public network. The encapsulated data is encrypted so that if any of it were stolen while in transit, the encryption key would be required to decrypt it. The VPN is extremely useful because a computer with a VPN connection can use virtually any Internet connection to reach the private network. The user can participate in the protected network, just as if he or she is connected locally. This is not only useful to telecommuters and traveling

employees, but VPNs can allow a company to use cheaper, high-speed access methods (cable and DSL, for example) to connect remote offices. Without the WAN expense, companies can easily save money with the VPN solution.

How the VPN Works

A VPN uses a process called *tunneling* to transport data. Generally speaking, tunneling is the act of moving data destined for one network over the infrastructure of another network. Most Virtual Private Networking solutions make use of one of two tunneling protocols. The protocols most widely used are *Point-to-Point Tunneling Protocol* (*PPTP*) and *Layer Two Tunneling Protocol* (*L2TP*), because they are flexible and widely supported. In some situations, a more powerful, and extremely secure, solution is required. *IPSec* (Internet Protocol Security) is a protocol for ensuring very strong security. The VPN client encapsulates packets that are destined to be routed between the two tunnel endpoints. This information that is added during the encapsulation process allows the VPN packets to be uniquely identified by other VPN participants. Microsoft VPN implementations support a number of authentication protocols. These protocols control the process of forming a VPN tunnel. The features of these protocols range from simple and almost insecure to complicated and highly secure.

For a simple explanation, the VPN tunnels network data to the destination by encapsulating network data in PPP (Point to Point Protocol) packets. These standard PPP packets can traverse a public medium, such as a phone line or the Internet, but the real data is hidden inside the packet. On the receiving end, the PPP data is stripped away to reveal the real data.

Connecting to a VPN Server

Although VPN connections may sound complicated, Windows XP does all of the work concerning encapsulation and such. Think of the VPN connection as you would a dial-up connection. They both allow access to remote resources. To make a VPN connection, the steps are almost the same as those used to create a dial-up connection. It is important to note that the VPN connection works on top of your Internet connection. If you are using the Internet to connect to a remote VPN server, you'll need to first establish an Internet connection, then establish the VPN connection. The following steps show you how to create a connection that will connect to a remote VPN server.

1. Open Network Connections in the Control Panel and click the Create a New Connection link under Network Tasks.
2. The New Connection Wizard appears. Click Next on the Welcome screen.
3. Click the Connect to a network at my workplace option and click Next, as shown in Figure 13-1.

New Connection Wizard
Network Connection Type
What do you want to do?
Connect to the Internet
Connect to the Internet so you can browse the Web and read email.
Connect to the network at my workplace
Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.
Set up a home or small office network
Connect to an existing home or small office network or set up a new one.
Set up an advanced connection
Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.
< Back
Next >
Cancel

Figure 13-1: Selecting a Network Connection Type.

4. On the next page, choose Virtual Private Network connection and click Next.
5. Enter a name for the connection and click Next.
6. On the Public Network page, you can choose to have Windows automatically dial the connection so that the VPN connection can be established, or you can choose to manually dial the connection, as needed. If you are using a broadband connection that is always connected, choose the Do not dial option. Make your selection and click Next.
7. In the VPN Server Selection window that appears, enter the fully qualified domain name (FQDN) or IP address of the VPN server to which you will connect. Click Next.
8. Click Finish.

Configuring Windows XP to Accept Incoming VPN Connections

Just as you can allow incoming connections on your Windows XP computer, you can also configure Windows XP to accept VPN connections from remote clients. This process works basically the same way as allowing incoming connections. Follow these steps:

1. Click Start → Connect To → Show All Connections, or open Network Connections in the Control Panel.
2. In the Network Connections window, click the Create a New Connection option under Network Tasks.

Solving VPN Connection Problems

If you dial in to a VPN server, but you cannot seem to access the rest of the network, the VPN server needs to be configured with an IP address and subnet mask that are the same as the internal network so the VPN server does not become a dead end. If you are using Windows XP as a VPN server, right-click the VPN icon in Network connections and click Properties. On the Networking tab, select Internet Protocol (TCP/IP) and click Properties. Adjust the IP address and subnet mask, as necessary.

If you are using a VPN connection, and other connection services to the Internet stop working, such as Internet Explorer, the VPN connection is configured to use the default gateway on the remote network you are accessing. This is helpful if you are accessing the Internet through a corporate network, but not if you are accessing a single VPN server. To stop using the remote default gateway, access the VPN connection properties and click the Networking tab. Select Internet Protocol (TCP/IP) from the list and click Properties. On the General tab, clear the Use Default Gateway On Remote Network check box.

3. Click Next on the New Connection Wizard's opening page.
4. In the Network Connection Type window, choose the Set up an advanced connection option and click Next.
5. On the Devices for Incoming Connections page, select the modem or broadband device you want to use to allow incoming connections. Click Next.
6. On the next page, choose the Allow virtual private connections option and click Next.
7. On the User permissions page, select the user accounts that are allowed to use a VPN connection. If the user account does not exist for the client, click New to create one. Click Next.
8. In the Networking Software window, add or remove networking software that can be used over the connection, as needed. Click Next.
9. Click Finish.

Managing VPNs and Firewalls

For the most part, utilizing VPN connectivity when one endpoint is behind a firewall is not an issue. Most firewalls allow liberal privileges when it comes to outgoing connections. Incoming connections are different, though. For a VPN server to accept incoming connections, the firewall (if any) that it resides behind needs to be configured to allow incoming connections on port 1723.

If the firewall makes use of the Network Address Translation (NAT) features, the firewall needs to be configured to forward VPN traffic to the appropriate internal host, as well as to allow incoming connections. External hosts cannot directly request access to hosts on a private LAN, so the firewall is left to play matchmaker and ensure that the incoming requests are forwarded to the correct internal server and nowhere else. Most software firewalls offer relatively simple interfaces for configuring the incoming ports, whereas many hardware firewalls (especially business-class equipment) can require moderate expertise to configure correctly. Using an Internet Connection Firewall (ICF) with VPN connections is not recommended.

Using Remote Desktop

Windows XP Professional includes a new feature called Remote Desktop Sharing or, more simply, Remote Desktop. Say that you have a Windows XP computer at your office. You also have a laptop computer, or even a home computer. Using Remote Desktop, you can connect to your office computer from another computer and access your office files and applications, just as if you are actually sitting in front of the office computer. Using Remote Desktop, a terminal window appears, and you simply use your office computer from your home or remote computer.

Remote Desktop is built on Windows 2000 Terminal Services, which allow you to create terminal sessions with remote machines. Remote Desktop uses this same principle. Through the Terminal window that appears, you can open files, launch programs, configure system changes, browse folders – basically anything you might do – as if you were sitting at the computer locally. As you can imagine, this feature has a lot of possibilities because your desktop PC no longer needs to be a local resource only.

Understanding Remote Desktop

Remote Desktop is generally easy to use and set up, but depending on the needed configuration, you might have a few networking snags to work through. Keep the following important points and restrictions in mind concerning Remote Desktop.

Windows XP Professional can function as a Remote Desktop host in that other computers can connect to it. You can connect to a Windows XP Professional computer and manage it remotely using Windows XP Professional or Home edition, or by installing the Remote Desktop Connection software on Windows 2000, Windows NT 4, Windows Me, Windows 98, or Windows 95. The setup and configuration of the Remote Desktop Connection software is explored later in this chapter.

Remote Desktop allows multiple users to connect to the same computer so that different users can access different resources and run different applications, as needed. When a remote user connects to the Remote Desktop host, the local desktop is locked. This prevents anyone from using the computer while you are logged on remotely.

Each client accessing the Remote Desktop host must have a direct connection to the host. This can be accomplished using a LAN/WAN connection, a dial-up connection, or a VPN connection, or it can be done over the Internet if the Remote Desktop host has a public IP address. See *Connecting with Remote Desktop* later in this chapter for details.

Turning on Remote Desktop

To use Remote Desktop, you must first turn on the Remote Desktop service on a Windows XP Professional computer that you want to function as the remote host. Keep in mind that only Windows XP Professional computers can be Remote Desktop hosts, but you can connect to the Remote Desktop using other Windows computer systems that run the Remote Desktop Connection software. To turn on Remote Desktop on a Windows XP Professional computer, follow these steps:

1. Log on to the Windows XP Professional computer as a member of the Administrators group. You cannot enable Remote Desktop without an administrator account.
2. Click Start → Control Panel → System. Open the System Properties dialog box, shown in Figure 13-2, and click the Remote tab. Click the Allow users to connect remotely to this computer check box.

Figure 13-2: Remote tab.

3. After the setting is enabled, the current user, and any member of the Administrators or Remote Desktop groups, can access the computer using Remote Desktop. However, you might want to change the default settings

to allow or prevent users from accessing Remote Desktop. One important note, however, is that any user who attempts to use Remote Desktop must have a password. Remote Desktop connections do not allow blank passwords. To manage the users that can access the Remote Desktop, click the Select Remote Users button.

4. In the Remote Desktop Users dialog box, shown in Figure 13-3, you can click the Add button to add users to the Remote Desktop group, or use the Remove button to remove users from that group. Keep in mind that local administrators automatically have access. When you are done, click OK.

Remote Desktop Users
The users listed below can connect to this computer, and any members of the Administrators group can connect even if they are not listed.
Administrator
Curt Simmons already has access.
Add...
Remove
To create new user accounts or add users to other groups, go to Control Panel and open User Accounts.
OK
Cancel

Figure 13-3: Determine which users can access the computer remotely.

Keep in mind that Remote Desktop does not allow blank passwords. If you want to give specific accounts access to the Remote Desktop, and those accounts use a blank password to log on to Windows, you must configure a password for those accounts. Users will then have to enter that password when logging on to Windows and when logging on to the Remote Desktop.

Connecting with Remote Desktop

For Remote Desktop to work, you must be able to make a connection to the host computer from the client computer. Depending on how you are connecting, that process might be simple. However, any remote connection has its own set of problems. Before configuring your client computers, you must determine how clients will connect to the Remote Desktop host. The following sections explore your options.

CONNECTING OVER A LAN/WAN

Connecting to a Remote Desktop host over a LAN or WAN is the easiest way to connect. The client computer uses the host computer's IP address or resolvable DNS

name to make a direct connection. You don't have to worry about any additional configuration. If you are connecting over different subnets, or are connecting to a remote office via some kind of dial-up connection, see the next section. Overall, if you are on a business LAN or WAN, you can seek help from your network administrator if you are having problems connecting from one LAN or WAN segment to another.

CONNECTING USING A DIAL-UP CONNECTION

You can connect to a Remote Desktop host through a dial-up connection. For example, say your work computer resides in a small office. That computer has a modem and is connected to the phone line. To access your work computer from a home computer, you first use the Create a New Connection Wizard on your work computer to configure the computer to accept incoming calls. Then, from your home computer, configure a dial-up connection to dial the work computer's number. You can then dial the work computer directly and create a Remote Desktop session.

CONNECTING USING THE INTERNET

You can connect to a Remote Desktop host over the Internet, but the process is a bit more complicated. When a computer is connected to the Internet, it is assigned an IP address by the Internet service provider (ISP). This public IP address must be used to make the Remote Desktop connection. The problem, however, is that public IP addresses change frequently. For example, if you are using a modem to connect to the Internet, each time you connect, you are generally given a new dynamic IP address. Even with broadband connections, such as cable and DSL, the IP addresses can change frequently. There is no easy solution for this issue; the simple fact is that you must know the IP address of the computer to connect to it. To find the public IP address, follow these steps:

1. Connect to the Internet.
2. Double-click the connection in Network Connections.
3. Click the Details tab, and you'll see the current public IP address.
4. You can then use this IP address to connect to the host from the client computer. If you are using a dial-up connection, you must leave the host computer connected to the Internet to make the Remote Desktop connection.

CONNECTING OVER A FIREWALL

Another difficulty concerning Remote Desktop connections over the Internet is firewalls. Most firewalls will not, by default, allow Remote Desktop traffic. If you need to connect to a Remote Desktop host that resides behind a firewall, you must consider a couple of issues. First, if you are using ICF on the host computer, you

need to access the Advanced Settings dialog box and enable Remote Desktop traffic. This will allow Remote Desktop traffic to pass through the firewall after the service is enabled. Second, if the host computer resides on a LAN that is protected by a firewall, or if another individual firewall product is used, you need to ask an administrator to configure the firewall to allow incoming access on TCP port 3389. Remote Desktop uses TCP port 3389, and the connection will fail if the firewall is not configured to allow incoming access on this port.

See Chapter 14 to learn more about using Internet Connection Firewall.

CONNECTING THROUGH A REMOTE ACCESS SERVER

If you need to connect to a Remote Desktop host over the Internet and through a remote access server (RAS), you should use a VPN connection. This gives you the most security when using the Remote Desktop host over the Internet. An administrator must configure the remote access server to allow VPN traffic. Once you connect to the network, you can start the Remote Desktop session with the host by simply connecting to it using the host's IP address.

Setting Up the Remote Desktop Client

After you have enabled the Remote Desktop host and you have determined how the client(s) will connect to the host, you can configure the Remote Desktop client. In Windows XP, the client software is known as Remote Desktop Connection (called Terminal Services Client in previous versions of Windows). The Remote Desktop Connection software enables a client to generate a terminal services connection with the host. If you are using Windows XP Professional or Windows XP Home Edition, there is nothing you need to configure. The Remote Desktop Connection software is already installed and configured on the system. See the next section to start a Remote Desktop session. If you are using Windows 2000, Windows NT 4.0, Windows Me, Windows 98, or Windows 95, you must install the Remote Desktop Connection software on those computers. The Remote Desktop Connection software is found on the Windows XP CD-ROM. Insert the CD-ROM in the desired client and choose Perform Additional Tasks, from the Welcome screen; then choose the Remote Desktop Connection option. This will install the software. If you do not have a Windows XP CD-ROM available, you can also download the software from Microsoft's Web site at `www.microsoft.com/windowsxp/pro/downloads/rdclientdl.asp`. Follow the simple setup instructions that appear.

Creating a Remote Desktop Connection

After the host and client are configured as needed, you can establish a Remote Desktop connection. To start the connection from a Windows XP client, click Start → All Programs → Accessories → Communications → Remote Desktop Connection. If you are connecting from a downlevel client, click Start → Programs → Accessories → Communications → Remote Desktop Connection. The Remote Desktop Connection dialog box appears, as shown in Figure 13-4.

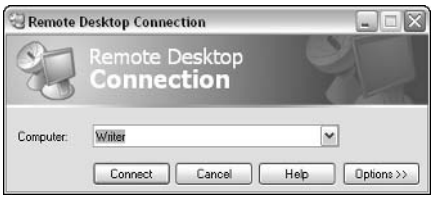

Figure 13-4: Remote Desktop Connection.

If you are connecting a host that resides on your LAN or WAN, simply enter the computer's name or IP address. If you are connecting through a VPN connection or over the Internet, use the remote host's IP address. After you have entered the name or IP address, just click Connect. Once the connection is made, the screen turns black, and you see a login dialog box. Enter a username and password of someone who is a member of the Remote Desktop group, one who has administrative privileges, or one who has been specifically assigned access to the Remote Desktop and click OK. After the username and password have been accepted, the terminal window provides your remote desktop.

You can maximize and minimize the terminal window, as needed, and simply use the remote computer through the terminal window, just as you would if you were sitting locally at the computer. Keep in mind as you are working with the Remote Desktop that you can open applications and create and save files. However, the files you create, edit, and save are saved on the remote computer. For this reason, you cannot save files to your local client desktop, and you cannot drag and drop items from the terminal window (host computer) to your local computer (client computer). You can use the terminal window to access network files remotely, but keep in mind that the remote account you are using must have permission to access items on the network.

Using Automatic Logon

To make Remote Desktop even easier, you can configure it to log on automatically. For example, say that you access your Windows XP Professional computer at work from a Windows XP Home computer most evenings. You can configure automatic logon to make the process quicker and easier. To configure the automatic logon option, follow these steps:

1. Click Start → All Programs → Accessories → Communications → Remote Desktop Connection.
2. In the Remote Desktop Connection dialog box, click the Options button.
3. On the General tab that appears, enter the computer to which you want to connect, the username, password, and domain (if necessary.) Click the Save my password check box, shown in Figure 13-5.
4. Click the Save As button. By default, the settings are saved in an .RDP file in My Documents with a filename of Default. If you want the settings you entered to be your default settings, simply click Save. If not, give a different name to the logon settings.
5. Click Connect to make the connection. From now on, you'll not be asked to provide the username and password when you make the Remote Desktop connection.

Managing Multiple Users

When you are using Remote Desktop, you can easily connect to the remote computer and use a terminal window. However, what happens if another user is accessing the computer locally? For example, say that you have a Remote Desktop account to access a computer from your home office. However, sometimes other administrators use the Windows XP Professional computer at the office when you are not there. In this case, one of two things can happen.

If Fast User Switching is enabled on the remote computer, the remote user sees a message. The user sitting at the computer locally has the ability to reject your message and keep you from logging on by clicking the No button. If no one is actually sitting at the computer (but is logged on), the local user is logged off because no response is given. In reality, the local user's session remains logged on because Fast User Switching is enabled, so all applications and all open files remain that way. However, the local user will not be able to use the computer until you log off.

If Fast User Switching is not enabled on the remote computer, you have the option to forcefully log the local user off the computer. The problem, however, is that the local user will not have the option to save any open files. For this reason, it is best to use Fast User Switching with Remote Desktop so that any local users accessing the computer will not lose data. On the other hand, in this same scenario, a local administrator can forcefully log on, disconnecting the remote user; or, if more than one person uses the same account, the local user can always disconnect the remote user. As you can see, you should put some thought into the management of users when multiple people use the same machine. The best practice if you are working with Remote Desktop is to give each user a different account and ensure that Fast User Switching is enabled.

Figure 13-5: General tab.

Configuring Remote Desktop Options

Remote Desktop gives you some configuration options that help you make the most of Remote Desktop, including some performance management features. If you are using Remote Desktop to connect to a remote desktop over a LAN or WAN, performance will probably not be an issue, because plenty of bandwidth is available. However, what if you need to connect to a remote desktop using a dial-up connection, VPN connection, or over the Internet? In this case, the amount of graphics that must be downloaded and displayed on your computer can cause Remote Desktop to perform slowly.

For this reason, Windows XP gives you some performance options that can help speed up Remote Desktop service, giving you better performance while removing some of the graphical interface that tends to slow things down. Open the Remote Desktop Connection, and in the Remote Desktop Connection dialog box, click the Options button. You see several available tabs. Click the Experience tab, shown in Figure 13-6.

Use the drop-down menu to select your connection speed, and use the check boxes to specify further connection options. As you can see, reducing the usage of items, such as Display Background, reduces the amount of bandwidth required to transmit the images to your remote computer. You can adjust these settings, as needed, until you find the performance level that meets your needs. Make sure you leave the Bitmap caching option enabled. Bitmap caching allows your computer to store bitmap images locally on your remote computer so that they do not have to be downloaded each time they need to be displayed—this actually speeds up the performance of the connection.

Figure 13-6: Experience tab.

Local Group Policy configurations prevent the Experience features from working correctly. The Windows XP Professional computer that functions as the remote host might have local as well as site, domain, and OU policies that prevent changing the Experience settings. If this is the case, talk to a network administrator about changing the Group Policy settings so that they are more lenient to allow the configuration of performance options.

You can also click the Display tab, shown in Figure 13-7, to modify how Windows handles the remote session in the terminal window. You can specify the resolution of the terminal window and the color depth. Again, lower settings help conserve bandwidth – they might not look as good, but you will see performance gains.

The Local Resources tab, shown in Figure 13-8, gives you some configuration options that can also help performance. Three categories are found on this tab for sound, keyboard, and local devices. You can choose to have sounds downloaded and played locally, such as in the case of Windows events, but this option does consume more bandwidth. The keyboard option allows you to use special key combinations that will operate when the remote session is open. The options you'll find here are self-explanatory. Finally, the Local devices option enables the mapping of the following to the remote host:

- Client disk drives
- Printers

- Serial ports
- Smart card devices

This option allows you to map drives from the remote host to your local computer. For example, say you are working on the remote computer, but you want to print the document on your home computer (remote client). This feature allows you to do that, or even access information on your local drives from within the terminal window.

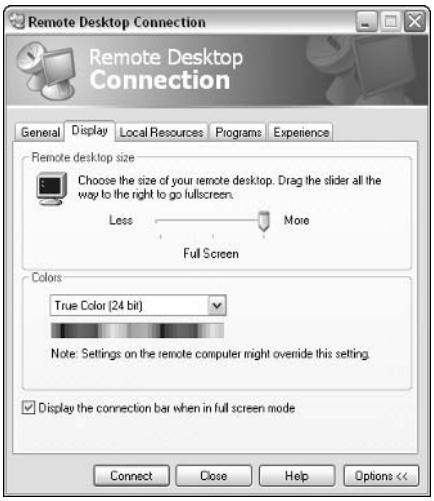

Figure 13-7: The Remote Desktop Connection Display tab.

Figure 13-8: The Remote Desktop Connection Local Resources tab.

Using Remote Desktop with Internet Explorer

If you travel with a laptop and you frequently use Remote Desktop over the Internet, or if you need to access your remote desktop computer from a variety of computers in different locations, you will use Internet Explorer to launch Remote Desktop sessions, rather than using the Remote Desktop Connection software. If you want to access Windows XP Professional Remote Desktop connections using Internet Explorer, you must configure Internet Information Services (IIS) on Windows XP Professional to allow the connection. After the configuration, you can generate a terminal session using Internet Explorer 4.0 or later.

To configure the Windows XP Professional host to allow Web connections, you must first install IIS. Open Add/Remove Programs in the Control Panel, and then click the Add/Remove Windows Components button to install IIS. Then, you can configure IIS to allow Remote Desktop, which runs the Remote Desktop Web Connection software. Follow these steps:

1. Click Add/Remove Programs in the Control Panel.
2. Click Add/Remove Windows Components.
3. On the Windows Components Wizard page, select Internet Information Services (IIS) and click the Details button.
4. In the Internet Information Services dialog box, select World Wide Web Service and click Details.
5. In the World Wide Web Service dialog box, select Remote Desktop Web Connection and click OK. Click OK again, and again to complete the wizard.

After the Remote Desktop Web Connection component is installed, you need to set the permissions. Follow these steps:

1. Click Start → Control Panel → Administrative Tools → Internet Information Services.
2. Expand the computer name, then navigate to Web Sites/Default Web Site/tsweb.
3. Right-click the tsweb container and click Properties.
4. Click the Directory Security tab and click Edit under Anonymous Access and Authentication Control.
5. In the Authentication Methods dialog box, ensure that anonymous access is allowed and click OK. Anonymous access only gives a remote user access to the IIS directory. Once connected, Remote Desktop will still require a username and password.

After the remote computer is configured to allow Web access to Remote Desktop, you can use your client computer to connect. You must be using Internet Explorer 4 or later to connect to the remote desktop with a Web browser. If you are connecting over the Internet to the remote computer, use the computer's public IP address to connect. If you are connecting through a RAS (Remote Access Server), make the connection and use the name or IP address of the remote desktop to generate the connection.

To connect to the remote desktop using Internet Explorer, open Internet Explorer and type the default address, which is `http://server/tsweb`. Again, if you are connecting over the Internet, use the public IP address to connect, as in `http://ipaddress/tsweb`. You'll see a Remote Desktop Web Connection screen.

When you first connect, you'll probably see a Security Warning (depending on your Internet Explorer configuration). The Remote Desktop installs an ActiveX control on your computer, so just click Yes to the Security Warning (if you do not, Remote Desktop will not work). You'll see the same logon dialog box. Enter your username and password and click OK. The Remote Desktop session opens in Internet Explorer or in full-screen mode, depending on your selection.

Concerning logon, when you arrive at the Remote Desktop Web Connection window in Internet Explorer, you can select the Send logon information for this connection check box. This provides you with the username and domain dialog boxes. However, a better idea is to simply add the Remote Desktop to your Favorites menu. This saves your server name, screen size, and username in the URL so you can connect automatically by simply clicking the Favorites option. You'll still have to enter your password, but this method is much faster. Note that to make this work, you must select the Send logon information for this connection check box and enter your username and domain in the provided dialog boxes on the Remote Desktop Web Connection page.

Using Remote Assistance

Windows XP provides a new and very helpful tool called Remote Assistance. You can use Remote Assistance to remotely access another user's Windows XP computer for troubleshooting purposes. With permission, you can even remotely control the user's computer to repair problems. Remote Assistance has far-reaching implications in support situations, or even between two users over the Internet. I live about 5 hours away from my sister who also uses Windows XP. If she has a problem, she can just send me a remote assistance invitation, and I can connect to her computer and control it remotely, just as I would using Remote Desktop.

When you use Remote Assistance, one user is termed the expert, while the user who needs help is called the novice. When the novice properly authorizes the expert, the expert can connect to the novice's computer and see what is going on. If the novice gives the expert full control, the expert can make configuration

changes on the remote computer. For Remote Assistance to work, both users must be connected to the same network or the Internet at the same time. Both must be using Windows XP Professional or Home editions, and the novice user must be an administrator on the local computer. Limited users cannot send remote assistance invitations.

How Remote Assistance Works

Remote Assistance works with invitations. The novice user sends an invitation for Remote Assistance to the expert user through e-mail or through Windows Messenger. The expert user then accepts the invitation, which opens a terminal window showing the novice user's desktop. Using Windows Messenger, the novice user and the expert user can even communicate with messages as the session is taking place. The novice user can allow the expert user to simply view his or her computer, or the novice user can give the expert full control.

The Remote Assistance invitation is made up of XML fields, containing data and the novice user's IP address. The expert's computer connects to this IP address and uses TCP port 3389 for the terminal session. All of these details are hidden from the user, so the connection seems easy, immediate, and transparent.

As with Remote Desktop, Remote Assistance can present some problems when connecting through a firewall. ICF works transparently with Remote Assistance, automatically opening TCP port 3389 for the connection. So, if either (or both) the novice or expert user(s) are running ICF, Remote Assistance will work automatically without either having to configure anything. If you are using Windows Messenger to make the connection, you shouldn't have any problems with firewalls. Windows Messenger is configured to work around the port issue, so if the firewall allows Windows Messenger traffic, you should still be able to use Remote Assistance without any trouble. If you are using a router or residential gateway, the router or residential gateway needs to support Universal Plug and Play (UPnP). UPnP is a standard that allows devices to communicate with each other over a network. If only one remote assistance computer is behind a NAT-based (Network Address Translation) firewall, Remote Assistance should still work; however, if both are behind a NAT firewall, the connection cannot be established. The lesson here is that routers and residential gateways should support UPnP to allow Remote Assistance to function. If you are about to purchase a router or residential gateway for your network, make sure it supports UPnP to work around this problem.

Enabling Remote Assistance

To use Remote Assistance, you must first turn on the feature. Open the Control Panel, then the System Applet. Click the Remote tab and select the Allow Remote Assistance invitations to be sent from this computer option, as shown in Figure 13-9.

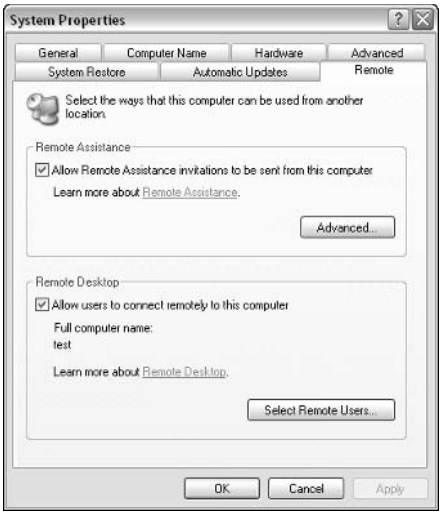

Figure 13-9: The System Properties Remote tab.

After you turn on Remote Assistance, click the Advanced button. This opens the Remote Assistance Settings dialog box (shown in Figure 13-10), which allows the novice to give the expert full control of the computer, if desired, and to set a time limit for the invitation to expire. By default, the invitation is good for 30 days. After the time expires, the expert can no longer connect to the novice using the invitation. You can adjust this expiration value as needed.

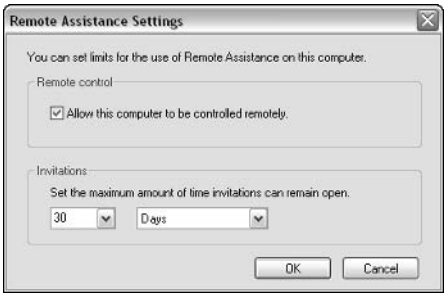
Remote Assistance Settings
You can set limits for the use of Remote Assistance on this computer.
Remote control
Allow this computer to be controlled remotely.
Invitations
Set the maximum amount of time invitations can remain open.
30
Days
OK
Cancel

Figure 13-10: Remote Assistance Settings.

Requesting Help from an Expert

After Remote Assistance is enabled on the novice computer, the novice user can easily request help from an expert. This can be done in three ways:

- A Remote Assistance invitation can be sent through e-mail as an e-mail attachment.

- A Remote Assistance invitation can be sent using Windows Messenger.
- A Remote Assistance invitation can be sent manually by copying the Remote Assistance (RA) ticket onto a floppy disk and hand delivering it to the expert.

When the novice is ready to request help from the expert, the novice uses the Windows XP Help and Support center to generate the ticket. The process is easy, and the following steps guide you through it. Remember that if you are using Remote Assistance over the Internet and a dial-up connection is in use on the novice computer, you must connect to the Internet before creating the invitation so that the correct public IP address can be used. Because you typically receive a different IP address each time you connect, you must connect and stay connected for the duration of the invitation and the session, or you'll have to cancel the invitation and send another one, because the expert will not receive the correct IP address if a disconnect occurs.

1. Click Start → Help and Support.
2. In the middle-to-upper-right portion of the window that appears (in the Help and Support Center) notice there is a section titled "Ask for Assistance." Click on the green square beside Invite a friend to connect to your computer with Remote Assistance.
3. Now the Remote Assistance portion of the Help and Support Center should be open. Select the Invite someone to help you option, as shown in Figure 13-11.

Figure 13-11: The Help and Support Center.

After the Invite someone to help you link has been clicked, there are three possible methods for sending a request from a novice to an expert:

- **Windows Messenger** – Click the Sign In button in the Windows XP Help and Support Center. After you are signed into Windows Messenger, choose a name and click Invite This Person. The expert receives the request in Windows Messenger and can accept the Invitation. If you want to use Windows Messenger, you can also bypass the Windows XP Help and Support Center and request help directly through Windows Messenger by clicking Actions → Ask for Remote Assistance, from the Windows Messenger toolbar.
- **E-mail** – You can send the invitation via e-mail by entering the e-mail address in the box provided in the Windows XP Help and Support Center and clicking Invite This Person. In the next window that appears, enter your name and a message and click Continue. In the next window, specify a time duration for the invitation and enter a password the expert user must enter to access your computer. Click Send Invitation. The message is entered in your default e-mail client (such as Outlook Express). The e-mail contains instructions and a file called rcBuddy.MsRcIncident. When the user receives the file, he or she can double-click it to start the Remote Assistance session.
- **Invitation file** – If you cannot e-mail the invitation or use Windows Messenger, you can save the invitation as a file, which can then be hand delivered to the desired recipient. Using this option, you can also enter a duration for the invitation and a password. The File is saved as RAInvitation. You can then transfer the file by hand, in an e-mail, or via a network share.

After the expert accepts the invitation and the connection takes place, the terminal session begins. The novice user receives a message that the invitation has been accepted. A terminal window appears on both the novice and expert user's computer, and a chat dialog box appears so that the two users can talk to each other during the session. The session appears in real time and, depending on network conditions, can be slow at times. If the novice has given the expert the option to take control, the expert can simply click the Take Control button that appears in Remote Assistance. At any time during the session, the novice can get control of the session and end it by clicking the Stop Control button, and pressing the ESC key or CTRL+C.

Chapter 14

Internet Access, ICS, and ICF

IN THIS CHAPTER

- Configuring Internet connections
- Using Internet Connection Sharing
- Configuring Internet Connection Firewall

ONLY A FEW YEARS AGO, Internet connections were reserved for computer enthusiasts who were willing to tolerate the slow Internet connections of the day just to be able to browse the World Wide Web. Today, millions upon millions of users are connected to the Internet; it has become a part of our lives. As such, computer users expect operating systems to be friendly to the Internet and help out with connections and features. Windows XP meets this need by providing a number of tools and configuration options to help you set up and manage your Internet connection. This chapter explores Internet connections, along with Internet Connection Sharing and Windows XP's new Internet Connection Firewall (ICF).

Exploring Internet Connections

An Internet connection is basically a connection to a remote server. With an Internet connection, you enable your computer to connect to a remote server at an Internet service provider (ISP). This server then facilitates your connection to the Internet by retrieving the data you need from various Web servers. To create an Internet connection, your computer needs both hardware and software. The computer has to be outfitted with some kind of connection hardware, such as a dial-up modem, DSL modem, cable modem, satellite connection, or other type of broadband hardware that is available. With the proper hardware, you'll also need an account with an ISP. The account includes a username and password that must be used by the connection software to validate your identity and give you Internet access. After you have the necessary hardware and your account with an ISP, you must use Windows XP to create a connection that can use the hardware and the account to connect to the ISP.

So, what kind of connection should you choose? That all depends on your needs and how much per month you are willing to pay. A standard dial-up connection will only give you 48-Kbps transfer speed at best, but they are fairly cheap (often under $20). For much faster service, DSL and cable connections give you broadband access at various speeds from 200 Kbps to over 1 Mb, in some cases. These services can range anywhere from $30 per month to over $100 for very fast connections. If you live out of cable or DSL range, you can also get satellite access through companies such as StarBand (`www.starband.com`) or DirecWay (`www.direcway.com`). Satellite access is not as fast as DSL or cable and it is more expensive, but it does provide broadband access at a reasonable rate. In case you are wondering, larger corporations most often use broadband connections, such as T1 or T3 links, often costing thousands of dollars per month. As you look at your Internet needs, you'll have to find a balance between what is available and what you are willing to pay each month. If you are interested in a few more details about the different types of connections, the following list outlines them for you.

- **Dial-up** – Basically, all areas of the United States provide some type of dial-up service. Dial-up service requires a modem and a phone line, and your computer dials a phone number to connect to an ISP server. Dial-up connections are the most common type of Internet connections used today. Most dial-up connections cost around $20 per month for unlimited use. The greatest drawback is that all modem connections are slow by today's standard. Phone line limits restrict modems to 56-Kbps transfer, with around 45-Kbps transfer being the reality. Considering the multimedia nature of today's Internet, this speed is rather slow, and you'll spend a lot of time waiting for pages to load. Additionally, the use of streaming media and even Internet radio is difficult to use. If you need Internet access for a small office, all computers will share the dial-up connection, which will further reduce the amount of available bandwidth.
- **Digital Subscriber Line (DSL)** – DSL is a broadband technology that has become very popular during the past few years. DSL provides broadband throughput, with speeds often between 400 Kbps and 8 Mbps, depending on your area. Also, DSL is an always-on technology, meaning the computer is always connected to the Internet and there is no need to dial a connection. DSL also works with public telephone lines, but different channels are used to transmit high-speed data. This feature allows DSL to always be connected, but voice calls can be made over the line at the same time. DSL requires a special DSL modem that connects to your computer, which is often included for free when you sign up for service. DSL service typically costs around $40 per month for basic, beginning service, and quite a bit more depending on the speed you want, but it is, unfortunately, not available in all areas. DSL hardware typically requires a USB or Ethernet connection to your computer.

- **Cable** – Cable Internet connections are another form of broadband connection and a direct competitor with DSL. Cable Internet uses a typical coaxial cable attached to your computer, just as you would use a coaxial cable with your television. Access to the Internet is performed over the cable connection and your cable company or service provider provides an always-on service, just as you would receive cable television. In the past, cable connections worked well, but often did not have the bandwidth of DSL. However, with new cable implementations, the cable access speed is just as fast as DSL and sometimes faster. As with DSL, you can expect to pay around $40 a month for cable Internet. Cable modems typically require an Ethernet or USB connection to your computer.
- **Satellite** – Satellite connections are relatively new in the Internet market and are the least popular type of Internet connectivity available. However, for people who cannot get other types of broadband connections, satellite connectivity is a good broadband solution, providing on average 300-Kbps transfer. However, it is not as fast as DSL and cable and costs considerably more. The satellite disk equipment generally costs around $500 and monthly, unlimited access is around $60. Satellite connections work with a satellite modem that connects to your computer through a USB or Ethernet port.

Configuring Internet Connections

After you have the hardware installed on the computer and the account information from the ISP, you can create an Internet connection on Windows XP that you can use to access the Internet. Note that some ISPs give you an installation disk and specific setup instructions for your computer, which are often necessary for broadband connections. You should follow the ISP's instructions for creating the Internet. However, if you need to create a connection without ISP software, Windows XP can help you create that connection with the New Connection Wizard. The following steps show you how to create an Internet connection using the New Connection Wizard.

It is a good idea to check out your ISP's instructions for setting up an Internet connection. Some ISPs, particularly broadband companies, provide you with their own setup wizard. So, use the New Connection Wizard if necessary, but be sure to follow any additional or different instructions provided by your ISP.

1. Click Start → Control Panel, and open the Network Connections folder.
2. In the Network Tasks dialog box, click the Create a New Connection link.

3. The New Connection Wizard appears. Click Next.
4. In the Network Connection Type window, shown in Figure 14-1, you can choose the kind of connection that you want to create. Select the Connect to the Internet radio button and click Next.

New Connection Wizard
Network Connection Type
What do you want to do?
Connect to the Internet
Connect to the Internet so you can browse the Web and read email.
Connect to the network at my workplace
Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.
Set up a home or small office network
Connect to an existing home or small office network or set up a new one.
Set up an advanced connection
Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.
< Back
Next >
Cancel

Figure 14-1: Choose the Connect to the Internet option.

5. In the Getting Ready window, you can choose from a list of ISPs if you do not have an account. This process opens a connection to a referral service so you can sign up with available service providers on the Internet. If you have an installation CD, you can also choose the option to run setup from the CD. Finally, you can choose the manual setup option, which is shown in the rest of the wizard steps here.
6. In the Internet Connection window, choose the type of connection that you are using, such as a dial-up, broadband that is always on, or broadband that requires a username and password. Make your selection and click Next, as shown in Figure 14-2. Because you are most likely to use the New Connection Wizard to set up modem connections, the rest of the steps focus on that option.
7. In the Connection Name window, enter a name for the connection and click Next. The name should be something memory-friendly that distinguishes the connection from other connections.
8. In the Phone Number window, enter the phone number required to dial the ISP and click Next.

9. In the Internet Account Information window, shown in Figure 14-3, enter your username and password and click the check box options that you want to use. Note that the account can be used by anyone using your computer, or just you. You can also make the connection the default connection, and you can turn on the Internet Connection Firewall. Make your entries and selections and click Next.
10. Click Finish. The new connection now appears in the Network Connections folder.

New Connection Wizard
Internet Connection
How do you want to connect to the Internet?
Connect using a dial-up modem
This type of connection uses a modem and a regular or ISDN phone line.
Connect using a broadband connection that requires a user name and password
This is a high-speed connection using either a DSL or cable modem. Your ISP may refer to this type of connection as PPPoE.
Connect using a broadband connection that is always on
This is a high-speed connection using either a cable modem, DSL or LAN connection. It is always active, and doesn't require you to sign in.
< Back
Next >
Cancel

Figure 14-2: Choose the type of connection.

You might notice the reference to Point-to-Point Protocol over Ethernet (PPPoE) when you select the type of connection that you want to create. PPPoE is used with broadband Internet connections that require a username and password (not always connected); it is specifically a protocol used by some broadband connections for access to the Internet. PPPoE is designed for users on a local area network (using standard Ethernet) who access the Internet over that Ethernet network through a broadband connection. In other words, Point-to-Point protocol, which is used on the Internet, functions over Ethernet to provide Internet access to these users. With PPPoE, each user can have a different access configuration, even though they all reside on the same LAN. ISPs also use PPPoE to control the use of static IP addresses. You can learn more about PPPoE by accessing RFC 2516 on the Internet.

New Connection Wizard
Internet Account Information
You will need an account name and password to sign in to your Internet account.
Type an ISP account name and password, then write down this information and store it in a safe place. (If you have forgotten an existing account name or password, contact your ISP.)
User name:
csimmons
Password:
Confirm password:
Use this account name and password when anyone connects to the Internet from this computer
Make this the default Internet connection
Turn on Internet Connection Firewall for this connection
< Back
Next >
Cancel

Figure 14-3: Enter the ISP assigned username and password.

Starting a Connection

If you use a dial-up connection, a connection to the ISP must be established each time you want to connect to the Internet. If you are using a broadband connection, the connection is always on. To launch a dial-up connection, you can use the connection icon that appears in the Network Connections folder, now that you have created the connection. Or, you can access the connection by clicking Start→ Connect To and clicking the connection. As you can see in Figure 14-4, all connections are found in the Network Connections folder.

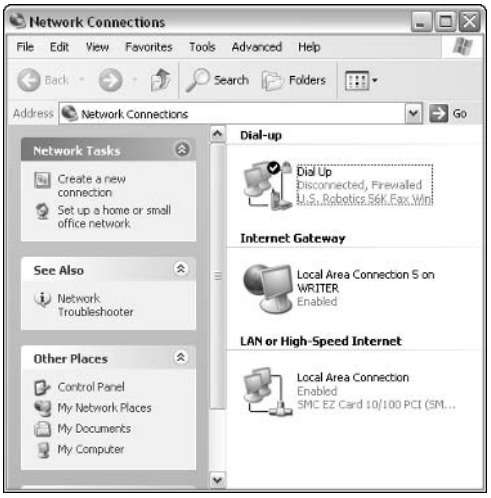

Figure 14-4: Network Connections folder.

If you are using a dial-up connection, you'll need to launch a connection to your ISP each time you want to use the Internet. You can do so from within Network Connections by double-clicking the connection icon, or by right-clicking the connection icon and clicking Connect. A connection window appears, as shown in Figure 14-5.

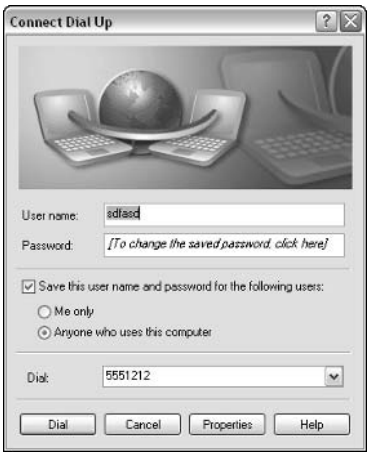

Figure 14-5: The Connect Dial Up dialog box.

Enter your username and password for the ISP. Notice that you can choose to save the username and password so you don't have to retype it each time. You can save the password for yourself only, which allows the connection to be used only with your user account, or you can choose to allow anyone who uses the computer to use the Internet connection. The phone number you entered appears by default. Click Dial to make the connection.

You should be aware of one security issue – if you use the Me only option, you are the only one who can launch the connection. However, if you leave the computer unattended, anyone who sits at the computer while you are logged on can launch the connection. If you want to make certain that no one can ever use the connection, simply leave the Save this username and password for the following users check box disabled, which will disable both suboptions. This way, you'll have to supply the username and password each time you connect.

Managing Dial-Up Connections

As with most Windows features, dial-up connections have properties pages that enable you to configure the connection and manage its behavior. In many cases, frustrations and problems with dial-up connections can be solved by making changes to dial-up connection properties, but you need to know what changes can

and should be made. The properties pages have a number of settings that determine how the connection operates; those settings are covered in the following sections.

General Tab

On the General tab of the Dial Up Properties dialog box, you have a few different items, as shown in Figure 14-6:

- **Modem configuration** – If you click the Configure button, you can access the modem's properties pages and make configuration changes, as desired. (See Chapter 4 to learn more about modem configuration and other hardware.)
- **Phone numbers** – You can configure alternative phone numbers that can be used with the connection, and you can configure dialing rules.
- **Notification** – Use the check box at the bottom of the page to display an icon in the Notification Area when connected.

Figure 14-6: General tab.

You might notice the option for Dialing Rules on the General tab. Dialing rules tell Windows XP how to handle area codes, long-distance calls, and even calling cards. In other words, area code rules help Windows XP know what calls are local, which ones are long distance, and how certain phone numbers should be handled. See the section, *Configuring Dialing Rules* later in this chapter for more information.

Options Tab

The Options tab, shown in Figure 14-7, gives you a few dialing and redialing options, as follows:

- **Display progress while connecting** – If you want to see the connection progress as the connection is being made, click this check box. If it is cleared, you won't be advised of any progress during the connection process.
- **Prompt for name and password, certificate, etc.** – If you want to be prompted for the username, password, certificate, and so on during the connection, check this option. If this information is entered in the connection and you don't want to have to reenter it each time, do not use this option.
- **Include Windows logon domain** – This option, which can only be used in conjunction with the Prompt for name and password, certificate, etc. option, requests the Windows domain for logon purposes. Generally, when dialing to an ISP, you do not need this option. If you were dialing to a corporate server using a Windows domain, this option would be helpful.
- **Prompt for phone number** – This option allows you to see, modify, and select the phone number that will be used when dialing the connection. If you only use one phone number, you can simply clear this check box option.
- **Redial attempts** – If the first dial connection is not successful, Windows can automatically redial the number. Use the selection box to determine how many times Windows tries to redial the connection before stopping. The default is 3.
- **Time between redial attempts** – By default, Windows XP waits 1 minute between each redial attempt. You can change this value, if desired.
- **Idle time before hanging up** – If you want the connection to automatically disconnect after a certain period of idle time, enter the value here. Use Never if you do not want the connection to automatically disconnect.
- **Redial if line is dropped** – If you lose the connection, this option will have Windows XP automatically try to redial the connection.
- **X.25** – If you are logging on to an X.25 network, click the X.25 button and enter the X.25 network provider and the remote server information, as required.

Figure 14-7: The Options tab.

Security Tab

The Security tab, shown in Figure 14-8, provides security settings for the dial-up connection. By default, the Typical connection options are used. This validates your username and password with the ISP's server. Notice that you also have Advanced connection options, but these options are generally used for dial-up connections to corporate networks, not to ISP servers. Do not change any of the settings on this tab unless explicitly instructed to do so by your ISP. Incorrectly changing these settings will stop your computer from successfully logging on to the ISP.

Figure 14-8: The Security tab.

Networking Tab

The Networking tab, shown in Figure 14-9, shows you the current networking services and protocols that are used for the connection. If you need additional services or protocols for the connection, use the Install button to add them. In most cases, for ISP connections, there is nothing you need to configure here.

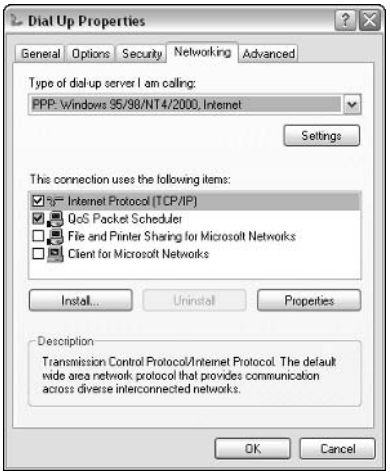

Figure 14-9: The Networking tab.

Advanced Tab

The Advanced tab enables you to turn on Internet Connection Firewall and Internet Connection Sharing, which you learn more about later in this chapter.

Common Connection Problems

It's no secret that dial-up connections can cause you some problems, due primarily to the nature of the connection over a public phone line. In many cases, there isn't much you can do, but keep the following quick fixes to some common problems in mind:

- **Connections drop** – Due to problems with phone line noise and/or problems with the ISP, connections can be dropped. Generally, there's nothing to do but redial the number. Keep in mind that the Options tab enables Windows XP to automatically redial if the connection is dropped, so you might want to make sure this option is enabled. If drops occur often, you should call technical support at your ISP for assistance.

- **Connections are automatically disconnected** – As a safety measure to keep connections from staying connected when in use, the Options tab has an auto-disconnect option. After the connection is idle for a certain period of time, the connection is disconnected automatically. If you do not want to use this option, however, simply disable it on the Options tab.
- **Connections are slow** – Slow connections can occur for a number of reasons, most of which are beyond your control. Modem speeds at your ISP, phone line congestion, and even phone line noise can contribute to this problem. If the modem seems to always connect at a low speed, make sure you have the correct modem driver installed. Otherwise, call the ISP for support.
- **Username and password prompts** – You can have Windows XP prompt you for the username and password, and even the phone number, each time a connection is made to the ISP. If you do not want to use these options, turn them off on the Options tab.
- **A "1" is always dialed when dialing phone numbers** – If a 1 is always dialed, you need to edit the area code rules properties from the General tab.
- **The logon fails each time during authentication** – If the logon fails during authentication, make sure you are using an appropriate username and password for the connection. Remember that your password might be case-sensitive. Also, check the Security tab and make sure you are using settings that are compatible with the ISP. If all seems to be in order, contact the ISP for assistance.

Configuring Dialing Rules

As mentioned earlier in this chapter, dialing rules enable you to configure how the modem dials various phone numbers. Because some locations require an area code, others do not, some require that you dial 9 to get an outside line, and so forth, the dialing rules options enable you to tell Windows XP how to dial your connection, regardless of your specific needs. Just follow these steps:

1. On the Dial Up Properties General tab, click the Use dialing rules check box; then click the Dialing Rules button.
2. The Phone and Modem Options window appears, as shown in Figure 14-10. On the Dialing Rules tab, you see the current location that is configured. You can choose to edit the existing location or create a new one by clicking the appropriate button. Regardless of whether you choose to edit a current location or create a new one, the same configuration dialog box appears.

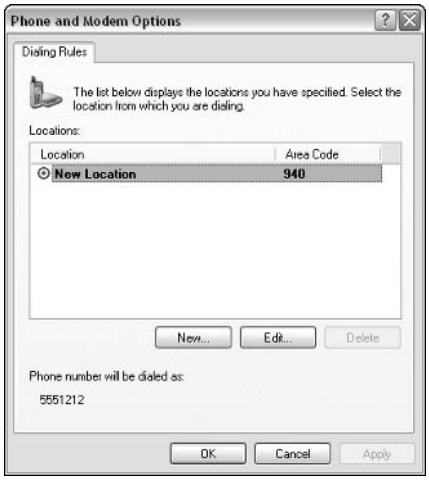

Figure 14-10: Phone and Modem Options — Dialing Rules.

3. The New or Edit Location window appears. On the General tab, shown in Figure 14-11, enter the area code and country/region the area code is found in; then use the Dialing rules boxes to determine the rules concerning the use of the area code. You can also choose to disable call waiting and choose tone or pulse dialing.

Figure 14-11: New Location settings.

4. Click the Area Code Rules tab. Area code rules determine how phone numbers are dialed within your current location as well as other locations. To create an area code rule, click the New button.

5. In the New Area Code Rule dialog box, shown in Figure 14-12, enter the area code to which this rule applies. Then, you can enter a list of prefixes that can be used with the area code, or accept the default that all prefixes you use can work with the area code. For example, say the area code is 214. You only want to use 564 and 569 prefixes with that area code. In this case, click the Include only the prefixes in the list below button and click Add to enter those prefixes. If you do not place any prefix restrictions, Windows XP will assume that any prefix you dial can be used with the area code. At the bottom of the dialog box, use the check boxes to determine if a 1 should be dialed when using the area code, and if the area code should be dialed when using the prefixes. For example, if a dial-out number is 214-564-1234, and the area code is required each time you dial the number, click the Include the area code check box. Click OK.

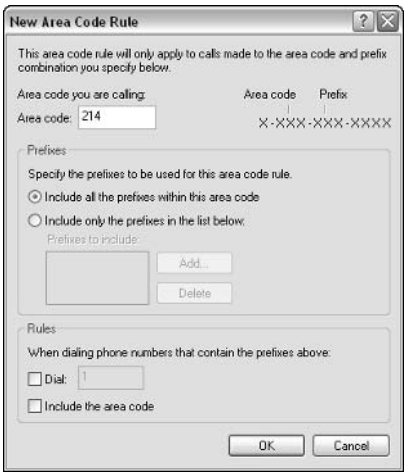
New Area Code Rule
This area code rule will only apply to calls made to the area code and prefix combination you specify below.
Area code you are calling:
Area code
Prefix
Area code: 214
X-XXX-XXX-XXXX
Prefixes
Specify the prefixes to be used for this area code rule.
Include all the prefixes within this area code
Include only the prefixes in the list below:
Prefixes to include:
Add...
Delete
Rules
When dialing phone numbers that contain the prefixes above:
Dial: 1
Include the area code
OK
Cancel

Figure 14-12: New Area Code Rule.

6. The new area code rule now appears in the Area Code Rules tab. You can create new area codes and edit existing ones at any time on this tab.

7. Click the Calling Card tab. If you need to use a Calling Card to make the connection, such as in the case of dialing a long-distance number when you are traveling with a laptop, enter your card information, as necessary, on the Calling Card tab, shown in Figure 14-13. Click OK to save your changes.

Figure 14-13: Calling Card tab.

Sharing an Internet Connection

As with previous versions of Windows, Windows XP gives you the option to share your Internet connection. You can share the Internet connection when you first create the connection using the New Connection Wizard, explored in the previous section, and you can also share an Internet connection when you run the Network Setup Wizard (refer to Chapter 11 for more information on the Network Setup Wizard). When you use Internet Connection Sharing (ICS), a single computer on the network becomes the ICS host, and all other computers on the network access the Internet through the ICS host's Internet connection. This feature enables you to have one Internet connection utilized by multiple computers.

As you are thinking about sharing an Internet connection, it is important to think about how the connection will be used. You can share any kind of Internet connection that you want, even a dial-up connection, but if multiple people are accessing the same connection, your bandwidth might run low. For this reason, broadband connections, such as DSL and cable, work better with ICS because they can provide much greater bandwidth. However, don't be fooled. Even some cable connections are relatively slow if several people are accessing the Internet at the same time, particularly if those users are accessing Internet multimedia applications or downloading programs and files. As with most decisions, you'll need to strike a balance between what you need, what kind of connection is available, and what you can afford.

Understanding ICS

When you enable the ICS host, the ICS host computer becomes an Internet gateway for the other computers on your network. When ICS is enabled, the ICS host uses the IP address of 192.168.0.1. Essentially, the ICS host becomes a Dynamic Host Configuration Protocol (DHCP) server for the other clients on your network, assigning IP addresses as needed. All other ICS clients on your network see the host computer as the gateway, and no other computer on your network can use the same address. When a client computer needs to access the Internet, a request is sent to the shared connection, which causes the ICS host to connect to the Internet and retrieve the requested information. To ICS client users, it appears as though their computers are directly connected to the Internet. Clients can use the Internet and retrieve e-mail seamlessly.

When you choose an ICS host while using the Network Setup Wizard, several things are configured on the ICS host. First, the local area connection for your internal network interface card (NIC) is configured as 192.168.0.1, with a subnet mask of 255.255.255.0. If the ICS host has more than one NIC for your workgroup, such as in the case of a multisegment network, you need to bridge those connections so that both network segments can use ICS. Next, the DHCP Allocator service is configured on the ICS host. When additional network clients are added to the network, this service automatically assigns IP addresses to those clients. As previously mentioned, the DHCP Allocator service allows the Windows XP computer to act as a DHCP server. The IP addresses range from 192.168.0.2 through 192.168.0.254 with a subnet mask of 255.255.255.0. A DNS proxy is also enabled so that additional Domain Name System (DNS) servers are not required on your network. These services run automatically in the background, and they require no additional configuration. Finally, if a modem connection is used on the ICS host, autodial is turned on by default so that the connection is automatically dialed when an ICS client makes a request to the Internet.

ICS will work on client computers running any version of Windows XP, Windows 2000, Windows Me, Windows 98, Windows NT, and Windows 95. To configure the clients, run the Network Setup Wizard from the Windows XP installation CD or from a setup disk you create. The wizard enables ICS Discovery and Control on the downlevel clients so they can access the ICS host. You need to also make sure that the downlevel clients are running Microsoft Internet Explorer 5.0 or later.

You might have noticed that the configuration options are performed when you configure ICS using the Network Setup Wizard. Of course, you can also turn on ICS using the Advanced tab of the Internet connection's properties. Which way is correct? If you are using all Windows XP computers on the network, enable the ICS feature on the Advanced tab, but if you are using

downlevel clients, it is best to use the Network Setup Wizard so that the DHCP Allocator service will be configured. Then, run the Network Setup Wizard on the client computers as well. Otherwise, the client computers might have problems connecting to the Windows XP host. When in doubt, use the Network Setup Wizard on the host and all client computers. This is your best way to get the service up and running and all computers connected quickly and easily.

Working with ICS

After ICS is configured, it is generally easy to use and not something you have to spend your time worrying about, but you should note some settings and features, as you may need to use them from time to time.

You access the ICS settings for the shared Internet connection by opening Network Connections on the host computer. Right-click the shared Internet connection (the icon appears with a hand under it to indicate it is shared), and click Properties. In the Dial Up Properties dialog box, click the Advanced tab, as shown in Figure 14-14. There are three options concerning ICS:

Dial Up Properties
General
Options
Security
Networking
Advanced
Internet Connection Firewall
Protect my computer and network by limiting or preventing access to this computer from the Internet
Learn more about Internet Connection Firewall.
Internet Connection Sharing
Allow other network users to connect through this computer's Internet connection
Establish a dial-up connection whenever a computer on my network attempts to access the Internet
Allow other network users to control or disable the shared Internet connection
Learn more about Internet Connection Sharing.
If you're not sure how to set these properties, use the Network Setup Wizard instead.
Settings...
OK
Cancel

Figure 14-14: ICS host settings.

- **Allow other network users to connect through this computer's Internet connection** — This option essentially enables or disables ICS. If you want to stop sharing the connection at some point in the future, clear this check box, which automatically clears the other check box options as well.

- **Establish a dial-up connection whenever a computer on my network attempts to access the Internet** – You'll only see this option if you are sharing a dial-up connection. This option allows Windows XP to automatically dial the connection when another computer in the workgroup attempts to use the Internet. If this selection is cleared, ICS clients will only be able to use the Internet when the ICS host computer is dialed up to the Internet manually. Under most circumstances, enabling this auto-dial setting is the best choice.
- **Allow other network users to control or disable the shared Internet connection** – This option, which is new in Windows XP, allows ICS clients to essentially control the connection. In a small home or office network, this setting might work well. Basically, users can manage the shared connection as though it was physically located on their computers.

As noted in the preceding list, you can enable or disable client management of the shared Internet connection. Consider this example: What do you do if you do not have access to the ICS host computer, but you need to disconnect the dial-up Internet connection to free up a shared telephone line? How can you find out if the connection appears to be working? ICS in Windows XP addresses these problems by allowing users to control and disconnect the Internet connection from any ICS client computer (not just from the ICS host computer). This feature is provided by ICS Discovery and Control, which broadcasts the availability of shared Internet connections from the host to client computers so they can use them. If you are using a broadband or always-on connection, these issues are not as important, but by default, client control of the Internet connection is enabled. When ICS Discovery and Control is in effect, the ICS host allows the ICS clients to discover the connection and manage it. Specifically, network clients can view Internet connection statistics, monitor the status of the connection, and connect and disconnect the connection to the ISP.

As long as the ICS host administrator does not disable ICS Discovery and Control by clearing the Allow other network users to control or disable the shared Internet connection check box on the Advanced tab of the shared connection's properties dialog box, clients can perform these actions. After ICS is set up, ICS clients will see a category named Internet Gateway in the Network Connections folder, which contains the icon of the shared Internet connection, as shown in Figure 14-15.

To use Internet Gateway to control the shared connection, double-click the icon to see a status dialog box, as shown in Figure 14-16. You can view the status, duration of the connection, its speed, and a count of packets sent and received through the gateway. Notice that you can click Disable to stop the connection from working. If other users are accessing the Internet at the time, they are disconnected as well.

Figure 14-15: Internet Gateway.

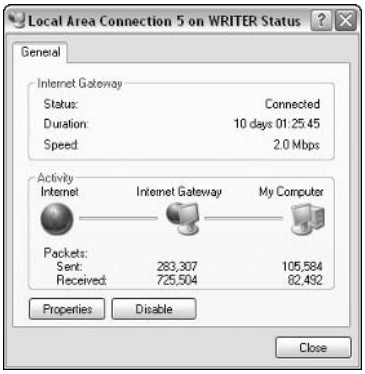

Figure 14-16: Internet Gateway status.

If you click the Properties button, a simple dialog box appears telling you which connection you are using, as shown in Figure 14-17. You can select the Show icon in notification area when connected option at the bottom of this dialog box to give yourself quick access to this Internet connection from the Windows desktop. Click the Settings button.

The Services tab of the Advanced Settings dialog box appears, as shown in Figure 14-18. This dialog box lets you select which services you want ICF to allow to run on your network. By default, most of these services are disabled for security reasons, and you don't need to enable them for typical Internet activities. Do not enable any services that you don't actually need to use without knowing the security risks involved. Note that the Advanced Settings options are not available if the host computer is not configured to allow users to manage the Internet connection.

Local Area Connection 5 on WRITER Properties
General
Connect to the Internet using:
Local Area Connection 5 on WRITER
This connection allows you to connect to the Internet through a shared connection on another computer.
Settings...
Show icon in notification area when connected
OK
Cancel

Figure 14–17: Use this tab to show the Internet Gateway in the notification area.

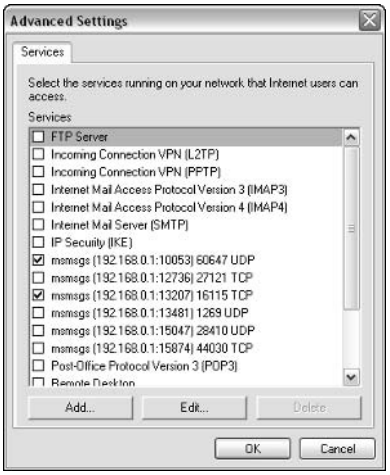

Figure 14–18: Enable or disable services.

Configuring Internet Connection Firewall

With the Internet comes the typical trouble one might expect from a worldwide network—hacker attacks and malicious content. Just as none of us can leave our front doors unlocked at night, your computer connected to the World Wide Web is subject to attack if you do not have some kind of protection. In the past, the firewall concept was limited only to large corporations. Today, firewalls are readily available for the home PC. Windows XP includes its own built-in firewall, called the Internet Connection Firewall (ICF).

ICF was specifically developed to protect modem and broadband Internet connections — it was not designed for large networks where other types of Internet access are used. In those networks, firewall hardware or software on Windows 2000 servers is used to control and manage Internet access. ICF, however, was designed for a local computer or a local computer that is providing a shared Internet connection to other computers on a small network. As such, if your computer is part of a Windows domain, do not enable ICF, or you'll probably lose all of your network connectivity.

ICF works with an Internet connection to provide security from external attacks. ICF uses a table method of protection, where ICF keeps track of all requests (and answers) that are made to the Internet. Anything that you do not explicitly request from the Internet is blocked by the firewall. Consider an example of accessing a typical Web page. Using your Web browser, you request a Web page. ICF makes an entry in its table noting the page you are requesting. When the Web page is served back to the computer, ICF examines the IP packets and looks at the IP addresses. If ICF finds a match after comparing the IP address of the traffic arriving against the table entry, it determines that the IP traffic was requested and allows the traffic to enter the computer. In the same situation, should any traffic arrive at the firewall that does not match an IP address listed in the table, the IP packets are dropped and are not allowed to enter the computer. ICF is considered a *stateful* firewall, because it examines all traffic passing in and out of the firewall and makes decisions concerning that traffic, as needed. In other words, ICF considers the current state of the packets and determines whether they are allowed or not based on the ICF table.

You can use ICF with ICS. Just enable ICF on the ICS host computer and your entire network is protected from Internet intruders.

Because all inbound traffic is dropped unless it has been specifically requested from an internal network client, ICF blocks some types of traffic that you might actually want on your network. For example, all incoming Internet Control Message Protocol (ICMP) traffic (such as ping requests) is blocked, as is all Remote Desktop traffic. So, ICF provides you with a way to override the table configuration for certain services.

Overall, ICS is easy to use, and you can get the protection you need if you simply follow a few important principles. First, all Internet connections should be firewalled. For example, if your computer has a broadband connection to the Internet as well as a dial-up connection to the Internet, both the broadband connection and the dial-up connection should be firewalled for complete protection. Failure to turn

Changing ICS Hosts

Networks change over time, and, as such, you might add new client computers or remove existing client computers, or you might even need to change the Windows XP computer that is functioning as the ICS host. If you need to change the ICS host, note that Windows XP will not allow another computer on the network to become the ICS host until you remove ICS on the original host. If you try to enable another computer as the ICS host, you'll receive a Network Connections error message.

To change the ICS host to another computer, follow these steps:

1. Disable the ICS host computer by clearing the Allow other network users to connect through this computer's Internet connection option on the Advanced tab of the Internet connection's properties dialog box. This will clear the former ICS host's IP address.
2. On the computer you want to become the new ICS host, run the Network Setup Wizard again, and choose the This computer connects directly to the Internet option. The other computers on your network connect to the Internet through this computer. When prompted, select the Internet connection directly connected to this computer that you will be sharing with the rest of the workgroup.
3. After the ICS host computer setup is complete, run the Network Setup Wizard on the client computers so that they will be configured to use the new ICS host. Choose the This computer connects to the Internet through another computer on my network or through a Residential Gateway option for each client computer.

on ICF for one of the Internet connections is considered a security breach because your computer or network will not be protected whenever that connection is used. Second, internal network connections should not be firewalled. NICs used to communicate on your local network must not be firewalled. If they are, computers on the network will not be able to access your computer because the ICF table will not allow any network traffic to enter the computer that is not explicitly requested by you. ICF is used on the Internet connection only, not on any internal network connections.

ICF does not protect you from every possible threat. ICF does not protect you from viruses; it doesn't detect downloaded viruses and e-mail viruses. You must use antivirus software with ICF for complete protection against these dangers. See `www.symantec.com` and `www.mcafee.com` for more information about antivirus products for Windows XP.

ICF does not protect you from Trojan horse viruses. Once they get into your computer (usually in e-mail you receive), Trojan horse viruses gather information from your computer, such as addresses from an e-mail address book, and send themselves to your contacts, spreading themselves further. Because ICF is only concerned with inbound traffic, ICF does not inspect outbound traffic for these threats. To ensure that your computer is not using Trojan horses or other viruses, you need a program that can safeguard your computer. Some third-party firewall products, such as ZoneAlarm (`www.zonealarm.com`), provide this kind of protection, but you should always use a combination of firewall and antivirus software for complete protection.

Finally, ICF does not protect you from internal attacks and threats. ICF only protects your Internet connection. If an internal user on your network decides to attack other computers inside the network, ICF provides no protection. Typically, however, in a home or small office network, this is not a serious issue.

Setting Up ICF

ICF is easy to set up and configure on Windows XP. This section shows you how to enable and configure ICF. Note that you must be logged on as a local computer administrator to enable and configure ICF.

You can enable ICF quickly and easily using a single check box. Click Start → Connect To → Show All Connections. In the Network Connections window, right-click the Internet connection on which you want to enable ICF, and click Properties. In the Dial Up Properties dialog box, click the Advanced tab, as shown in Figure 14-19. In the Internet Connection Firewall section, select the Protect my computer and network by limiting or preventing access to this computer from the Internet check box and click OK. The connection is now firewalled.

When Not to Use ICF

You should not use ICF if you are using another firewall product, such as a residential gateway or another firewall software product. You should only use one firewall product, whether that product is a hardware or software solution. Multiple firewall products usually do not work together and can cause you to lose your Internet connection. Also, never firewall a NIC that is used to connect to other computers on your network including a connection to a proxy server or firewall server. ICF is designed for home and small office use and will cause network communication problems if you try to use it on a Windows domain on which you are using virtual private networking (VPN). ICF does not work with VPN connections and will hinder communication.

Dial Up Properties
General
Options
Security
Networking
Advanced
Internet Connection Firewall
Protect my computer and network by limiting or preventing access to this computer from the Internet
Learn more about Internet Connection Firewall.
Internet Connection Sharing
Allow other network users to connect through this computer's Internet connection
Establish a dial-up connection whenever a computer on my network attempts to access the Internet
Allow other network users to control or disable the shared Internet connection
Learn more about Internet Connection Sharing.
If you're not sure how to set these properties, use the Network Setup Wizard instead.
Settings...
OK
Cancel

Figure 14–19: Turn on ICF on the Advanced tab.

Enabling Services

Because ICF blocks all incoming communication that is not explicitly requested, some services will not work with ICF unless you make further configurations. For example, say that you are hosting a Web site on your computer. If users try to access the Web site, the traffic coming to your computer is not solicited, so the packets would be dropped. Or, you might want to access your computer from a remote location using Remote Desktop. ICF will not allow the communication because it is not solicited. Because ICF's blocking functions by default affect all protocols and TCP ports, you might want to override the ICF behavior for certain services so that they will work with ICF. To enable a service to work with ICF, follow these steps:

Do not turn on these services unless you are providing them from your computer. For example, you don't need to turn on Web Server to access Web servers on the Internet. You only need to enable this option if your computer is a Web server and hosting a Web site *to* the Internet.

1. Click Start → Network Connections → Show All Connections.
2. Right-click the ICF-protected connection and click Properties.
3. Select the Advanced tab and click the Settings button.

4. On the Services tab of the Advanced Settings dialog box, shown in Figure 14-20, select each service that you want to enable. Remote Desktop is enabled in this figure.

Figure 14-20: Enable services to work with ICF.

5. When you first select a service, the Service Settings dialog box appears for that service, showing its default settings, including the name of the network computer on which the service is to be enabled. If you want to enable the service for a different computer on your network, type its name or IP address in the Name box.
6. Click OK on the Settings tab. You can adjust these settings at any time by selecting the service and clicking the Edit button.
7. If you want to enable a service that is not listed, click the Add button, and enter the service name, address, and port numbers.
8. Click OK to close each dialog box when you are done.

The predefined services listed on the Services tab are the ones most often used. However, what if you are using a custom service? For example, your computer might host a custom application that other users access via the Internet. Can you use the custom application with ICF? Yes, but you'll need to create a service entry and define some parameters for the service. Follow these steps:

1. Click Start → Network Connections → Show All Connections.
2. Right-click the ICF-protected connection and click Properties.

3. Select the Advanced tab and click the Settings button.
4. On the Services tab, click the Add button.
5. In the Service Settings dialog box that appears, shown in Figure 14-21, enter a friendly description, the name or IP address of the computer hosting the service (such as your computer or another computer on your network), and then enter the internal and external port numbers used for the service and protocol.

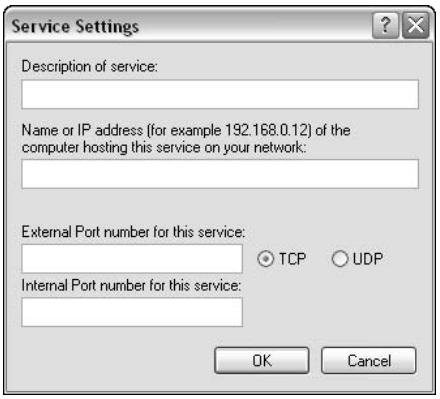
Service Settings
Description of service:
Name or IP address (for example 192.168.0.12) of the computer hosting this service on your network:
External Port number for this service:
TCP
UDP
Internal Port number for this service:
OK
Cancel

Figure 14-21: Configure the new service option.

6. Click OK to add the service, and then close the remaining dialog boxes.

Allowing ICMP Traffic

ICMP is a protocol used for troubleshooting and for network diagnostics. Common TCP/IP network tools, such as ping and tracert, use ICMP. You can collect a great deal of helpful information about networking conditions and problems; but ICF blocks all ICMP traffic by default because the traffic is not originating from your computer.

You can enable some or all of the ICMP information requests, depending on which features you want to make available. If you open the Advanced Settings dialog box of the ICF-protected connection's properties dialog box once again, and select the ICMP tab, you'll see a list of options that enable you to specify the ICMP requests you want to make available. See Figure 14-22.

Using the ICF Log

ICF gives you the option of logging the events that occur with ICF, but the log is not set up and configured by default. Using ICF's simple log file, you can log dropped packets as well as all successful connections. You can also determine the maximum size to which the log file can grow.

If you choose to log dropped packets, you can view the log file and see what attempts to access your computer over the Internet have been thwarted. This gives you clues about anyone who might be trying to tamper with your network. If you log successful connections, you'll see the destination IP address of every site that you have visited. However, this will cause the log file to grow rapidly, especially if the Internet is used a lot on the local computer or on an ICS network.

To configure the security log, just follow these steps:

1. Click Start → Network Connections → Show All Connections.
2. Right-click an Internet connection with ICF enabled and click Properties.
3. In the Properties dialog box, select the Advanced tab. Click the Settings button.
4. Select the Security Logging tab, shown in Figure 14-23.

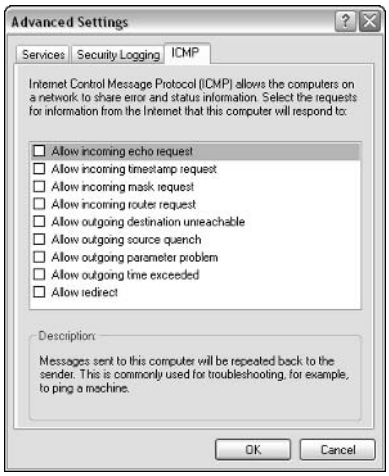
Advanced Settings
Services
Security Logging
ICMP
Internet Control Message Protocol (ICMP) allows the computers on a network to share error and status information. Select the requests for information from the Internet that this computer will respond to:
Allow incoming echo request
Allow incoming timestamp request
Allow incoming mask request
Allow incoming router request
Allow outgoing destination unreachable
Allow outgoing source quench
Allow outgoing parameter problem
Allow outgoing time exceeded
Allow redirect
Description
Messages sent to this computer will be repeated back to the sender. This is commonly used for troubleshooting, for example, to ping a machine.
OK
Cancel

Figure 14-22: Enable ICMP services on this tab.

5. Under Logging Options, select either or both Log dropped packets and Log successful connections.
6. By default, the log file is named pfirewall.log, and it is stored in your Windows directory. If you want to store it elsewhere, click the Browse button or type another destination in the Name box.
7. The default maximum log file size is 4,096 KB. You can decrease this value if you like, or increase it to a maximum size of 32,767 KB.
8. Click OK when you're done.

ICMP Options

In case you are wondering what each ICMP option is, exactly, here are some quick definitions:

- **Allow incoming echo request** — This option permits a ping test to complete. A message is sent to the computer and is echoed back to the sender. The ping utility tests for network connectivity.
- **Allow incoming timestamp request** — This option enables data sent to the computer to be acknowledged with a timestamp.
- **Allow incoming mask request** — This option enables the computer to listen for and respond to requests for more information about the public network to which it is connected.
- **Allow incoming router request** — This option permits the computer to respond to requests for router information.
- **Allow outgoing destination unreachable** — This option causes the computer to acknowledge and display a "destination unreachable" message when data does not reach the computer due to errors or transmission problems.
- **Allow outgoing source quench** — This option permits the computer to send a "slow down" message when data is arriving at the computer and the computer cannot keep up.
- **Allow outgoing parameter problem** — This option permits the computer to send a "bad header" message when data is received with an incorrect or problematic header and is dropped.
- **Allow outgoing time exceeded** — This option causes the computer to send a "time expired" message to the sender when data is incomplete because it took too long to send.
- **Allow redirect** — This option enables data that is sent from the computer to be rerouted if the default path changes.

After logging is turned on, you can view the log file at any time by simply opening it with Notepad or any text editor or word processing application. The ICF log file contains TCP/IP information about the connection or dropped packets. The ICF log is a W3C Extended File format log, which can be opened and analyzed with third-party logging utilities, as well.

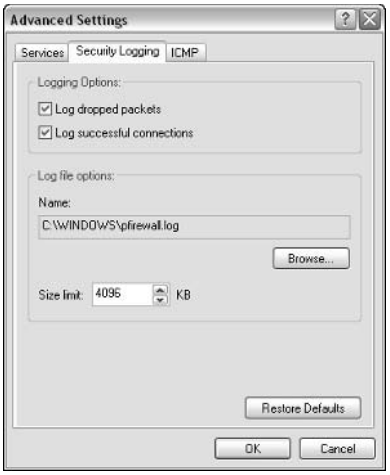

Figure 14-23: Security Logging tab.

ICF and E-mail

ICF works seamlessly with most e-mail applications. This means that you do not need to configure the e-mail application to work with ICF. However, an example of when ICF and an e-mail application can have problems has to do with *notification messages*.

If you are using Web-based e-mail, such as Hotmail, where you log on to a mail server on the Internet, ICF will work without any problems. If you are using an e-mail client, such as Microsoft Outlook Express, which polls its mail server to see if new mail is present (and the mail is downloaded if it is), ICF will not interfere with this kind of communication.

However, if your e-mail client waits for a remote procedure call (RPC) from a mail server that tells the e-mail client that there is mail to download, ICF will block the RPC traffic because it will appear as unsolicited traffic. Outlook is an example of an e-mail application that uses RPCs. If you are using Outlook to access e-mail from a Post Office Protocol (POP) server, you are not likely to have problems. However, if you are accessing a corporate Exchange server from the Internet, ICF will block the RPC messages from the Exchange server.

Chapter 15

Sharing and Security

IN THIS CHAPTER

- Simple File Sharing
- Manage shared folders
- Working with Share and NTFS permissions
- Managing caching, ownership, and shared printers

IF YOU HAVE NETWORKED with Windows XP, you know that the major reason for networking is to share information, whether that information is a collection of files, or even a shared printer or hard disk However, along with sharing can come difficult decisions concerning security. After all, you want to give users access to shared items on your Windows XP computer, but you probably also need to control what those users can and can't do with those items. Fortunately, Windows XP provides plenty of security options that will meet your needs. This chapter considers sharing and security.

Understanding Simple File Sharing

To begin working with shared folders and security settings in Windows XP Professional, you need to first understand a new feature of Windows XP called Simple File Sharing (SFS). It's a great feature, but one that initially causes some confusion, especially if you have come to Windows XP from a Windows 2000 computer.

In an effort to make computing easier, Windows XP uses SFS by default. SFS is actually a collection of NT File System (NTFS) settings that govern how Windows XP will share and manage shared files and folders. In short, SFS is designed to simplify sharing and security. Average users can share files and folders and never have to worry about security settings, because they are configured by default. SFS only gives you a few options and it isn't very flexible; but for a home or small office network where everyone trusts everyone, it is a great feature that keeps you from having to configure permissions on shared resources.

SFS is a collection of default settings that govern shared folders and user access. When you install Windows XP, or under most default installations or upgrades from Windows 9*x*, SFS is automatically configured. That configuration creates a

collection of shared folders automatically so you can easily share documents and files with users on other computers and for those persons who have administrative privileges on your local computer. For administrators on the local computer, all of the files in your user profile are made visible. You can also create a Shared Documents folder to place shared documents so that any user on your local system can access them. The default location for the shared documents folder is C:\Documents and Settings\All Users\Documents, as you can see in Figure 15-1.

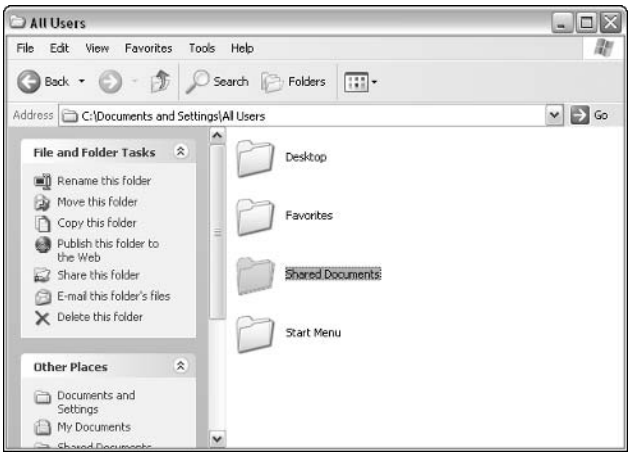

Figure 15-1: The Shared Documents folder is a place of general access.

How does Simple File Sharing affect the sharing of files and folders in a network? SFS is basically an all-or-nothing approach. You can share a folder or make it private so that no one can access it. If you choose to share the folder, users on your network have read access, but you can change the setting so that users have full control. However, you can't individually manage user access permissions or create other restrictions or privileges under SFS.

Overall, use SFS if you have a home network or a small office network where everyone trusts each other. Beyond that, if you need more access to security settings and more security flexibility, you can turn off SFS and use NTFS permissions. To turn off SRS, access Folder Options in the Control Panel. On the View tab, clear the Use simple file sharing check box, shown in Figure 15-2. The next section gives you more details about using SFS when sharing folders.

Windows XP Home Edition does not support networking with NTFS permissions. You *must* use SFS on Windows XP Home Edition and you cannot disable it.

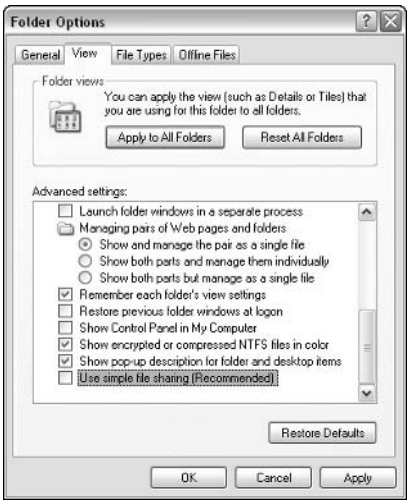
Folder Options
General
View
File Types
Offline Files
Folder views
You can apply the view (such as Details or Tiles) that you are using for this folder to all folders.
Apply to All Folders
Reset All Folders
Advanced settings:
Launch folder windows in a separate process
Managing pairs of Web pages and folders
Show and manage the pair as a single file
Show both parts and manage them individually
Show both parts but manage as a single file
Remember each folder's view settings
Restore previous folder windows at logon
Show Control Panel in My Computer
Show encrypted or compressed NTFS files in color
Show pop-up description for folder and desktop items
Use simple file sharing (Recommended)
Restore Defaults
OK
Cancel
Apply

Figure 15-2: Turn off SFS and use NTFS permissions.

Working with Shared Folders

One of the major ways you'll use shared resources on a network is through shared folders. Shared folders can contain all kinds of data and files. The purpose of sharing a folder, of course, is to give network users access to the contents of that folder. Using Windows XP Professional, you can share folders either through SFS, or if you choose to use NTFS permissions, you can share the folder and set permissions as needed.

Your computer must be configured for networking for the sharing option to appear. This includes a network adapter card and the configuration of File and Printer sharing.

See Chapter 11 to learn more about configuring your computer for networking.

Next, if you are using SFS, you are ready to share any folder by simply accessing the folder's properties dialog box. To share a folder, simply right-click the desired folder, click Properties, and then click the Sharing tab. As you can see in Figure 15-3, the Sharing tab gives you two options when you use SFS.

Book Photos Properties
General
Sharing
Customize
Local sharing and security
To share this folder with other users of this computer only, drag it to the Shared Documents folder.
To make this folder and its subfolders private so that only you have access, select the following check box.
Make this folder private
Network sharing and security
To share this folder with both network users and other users of this computer, select the first check box below and type a share name.
Share this folder on the network
Share name:
Book Photos
Allow network users to change my files
Learn more about sharing and security.
OK
Cancel
Apply

Figure 15-3: The Sharing tab using SFS.

1. You can share the folder locally. If you want only users of your local computer to be able to access the folder, simply drag the folder to the Shared Documents folder that is available in Windows XP. When a user logs on to the computer, the Shared Documents folder is available to the user, as is anything stored in the folder.
2. You also have the option to make the folder private. If you choose this option, there are a few issues you should consider.
   - When you choose the private option, no one else who uses your computer will be able to access the private folder. However, the configuration only applies to folders within your user profile. In other words, you can't make an application folder private.
   - When you use the private option, all files and subfolders within the private folder are also private. You can't individually manage subfolders and files for privacy purposes.
   - If you later decide to move the private folder to another folder, the folder then inherits whatever settings are configured on the target folder.

   Keep in mind that this option is designed to give you privacy from other people who access your local computer, but keep the limitations in mind as well.

To share the folder on the network, select the Share this folder on the network check box, and then enter a desired share name. To stop a folder from being shared, simply clear this check box. If you want network users to be able to change files in the folder, just click the Allow network users to change my files check box.

If you decide that you do not want to use SFS and turn it off using Folder Options (see the previous section), the Sharing tab changes and you also see a Security tab on a folder's properties dialog box, as shown in Figure 15-4. You can choose to share the folder, give the folder a name and comment, limit the number of users who can connect at any given time, and you can configure permissions and caching functions. Security and caching options are explored later in this chapter.

Figure 15-4: The Sharing tab without SFS.

You can also use Computer Management's Shared Folders feature to manage shared connections. For example, you can see how many users are connected to a particular shared folder and view open files. You can forcefully disconnect sessions from this console, as well. The following steps show you how to use the Computer Management console.

1. Log on as an administrator.
2. Open Control Panel → Administrative Tools → Computer Management.
3. In the Computer Management console, shown in Figure 15-5, expand Shared Folders. You can then view the shares, sessions, and open files. To close sessions and open files, right-click Sessions or Open Files in the left console pane and choose either Disconnect All Sessions or Disconnect All Open Files.
4. Close the console when you're done.

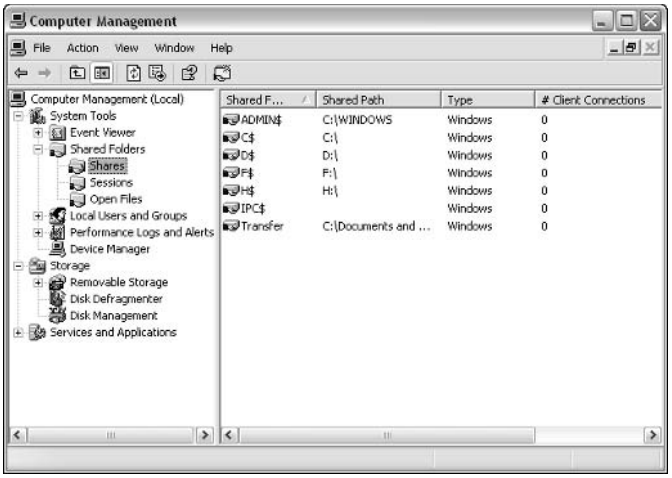

Figure 15-5: Use the Computer Management console to manage shared folders.

Using Share and NTFS Permissions

You can use share permissions or NTFS permissions to manage access to shared folders, if you are not using SFS. Using NTFS permissions, you can accurately control what users can and cannot do with a locally shared folder. If you've spent any time on a Microsoft network, you know that the issue of permissions can certainly get complicated and difficult. Permissions give you that fine level of control you want, but they can certainly get out of hand if you don't have a clear vision of what you are trying to accomplish from a security perspective.

As noted in the previous section, with NTFS, you can access the Sharing tab, you can still elect to share the folder and assign a desired name, and you can even limit the number of users who can connect to the share at the same time. You can also set folder permissions. There is no difference in file and folder permissions in Windows XP than in Windows 2000, so if you have worked with Windows 2000 Server, you'll see no differences here. The following sections take a look at file and folder permissions and advanced NTFS permissions.

File and Folder Permissions with NTFS

File and folder permissions are set on the Security tab found on the properties sheet of the file or folder. Simply right-click the desired file or folder, click Properties, and then click the Security tab, shown in Figure 15-6. As you can see, you can select a desired group or individual user and configure the desired file level permissions for that file.

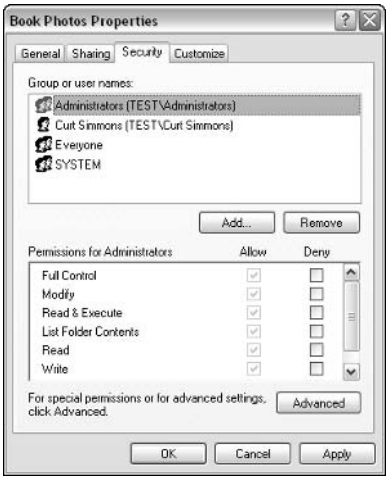

Figure 15-6: File and folder permissions.

The standard permissions are Full Control, Modify, Read & Execute, List Folder Contents, Read, Write, and special permissions. In truth, each of these permissions is actually made up of a combination of certain special permissions. Before looking at what special permissions make up these standard permissions, first consider the special permissions and their definitions, which are described in Table 15-1.

TABLE 15-1 SPECIAL PERMISSIONS DEFINITIONS

Special Permission	Explanation
Traverse Folder, Execute File	Allows or denies browsing through folders to reach other subfolders.
List Folder, Read Data	List Folder allows or denies viewing file and/or subfolder names. Read Data allows or denies reading data in a file.
Read Attributes	Allows or denies the reading of attributes of a file or folder.
Read Extended Attributes	Allows or denies the reading of extended attributes of a file or folder.
Create Files, Write Data	Create Files allows or denies the right to create a file in a particular folder. Write Data allows or denies the writing of new data to a file or the overwriting of existing information.

Continued

TABLE 15-1 SPECIAL PERMISSIONS DEFINITIONS *(Continued)*

Special Permission	Explanation
Create Folders, Append Data	Create Files allows or denies the ability to create subfolders in a folder. Append Data allows or denies the appending of data to an existing file (does not allow the changing of existing data in the file).
Write Attributes	Allows or denies the editing of attributes in a file or folder.
Write Extended Attributes	Allows or denies the writing of extended attributes for a file or folder.
Delete Subfolders and Files	Allows or denies the power to delete subfolders and files within a folder.
Delete	Allows the deletion of a file or folder.
Read	Allows or denies reading of a file or folder.
Change permissions	Allows or denies the ability to change permissions for a file or folder.
Take Ownership	Allows or denies the power to take ownership of a file or folder.
Synchronize	Allows or denies the power to synchronize data.

Standard permissions are combinations of special permissions that give users or groups certain rights. The following list tells you which special permissions are included in which standard permissions:

- **Full Control** – Full Control permissions contain all special permissions.
- **Modify** – Modify permissions contain the following special permissions:
  - Traverse Folder/Execute file
  - List Folder/Read Data

    Read Attributes

    Read Extended Attributes

    Create Files/Write Data

    Create Folders/Append Data

Write Attributes, Write Extended Attributes

Delete

Read

Synchronize

- Read and Execute

  Traverse Folder/Execute File

  List Folder/Read Data

  Read Attributes

  Read Extended Attributes

  Read

  Synchronize

- List Folder Contents

  Traverse Folder/Execute File

  List Folder/Read Data

  Read Attributes

  Read Extended Attributes

  Read

  Synchronize

- Read

  List Folder/Read Data

  Read Attributes

  Read Extended Attributes

  Read

  Synchronize

- Write

  Create Files/Write Data

  Create Folders/Append Data

  Write Attributes

  Write Extended Attributes

  Read

Now that you have taken a look at the file and folder standard permissions and what special permissions make up the standard permissions, it is important for you to know how the permissions work together. You should keep in mind two important rules as you work with NTFS permissions:

1. *File and Folder permissions are cumulative*. If a user has Read permission but that same user is a member of a group that has Full Control permission, the user's effective permission is Full Control. In situations where multiple permissions apply to the same user, the least restrictive permission takes effect.
2. *Deny permission overrides all other permissions*. This is an exception to the first rule. For example, say that a user has Full Control permission but is a member of a group that is denied access. In this case, the user's effective permission is Deny. The user has no access to the file at all.

Advanced NTFS Permissions

Under most circumstances, the standard permissions of Full Control, Modify, Read & Execute, List Folder Contents, Read, and Write are all you need to effectively manage user access to shared folders and files. However, in some cases, you may need to customize the security settings for a particular user or group. For example, what if you wanted to give a particular group Full Control to a shared folder without the special permission of Take Ownership? You would do so through advanced permissions.

You can easily set advanced permissions for any desired file or folder and apply those advanced permissions to a desired user group. One issue you must consider, however, is inheritance. By default, objects in Windows XP Professional, as well as Windows 2000, inherit the properties of the parent object. For example, say that a particular folder called Docs resides in a shared folder called Company. By default, the properties and permissions of Company are enforced on the Docs folder, as well. This inheritance behavior keeps administrators from having to configure folder after folder. Instead, you configure the top-level folder and all subfolders inherit those settings. As you can guess, this is a great timesaving feature. However, at times, you might need to override this feature, and you can do so with the Advanced security settings, as needed. The following steps show you how:

1. Log on as an administrator.
2. Right-click the desired file or folder and click Properties. Click the Security tab.
3. Choose the desired user or group from the provided list and click the Advanced button.

4. The Advanced Security Settings window appears, as shown in Figure 15-7. Note that the Inherit from parent the permission entries that apply to child objects . . . check box is selected by default. If you want to override inheritance for this object, deselect the check box here. Select the user/group in the window for whom you want to change permissions and click the Edit button.

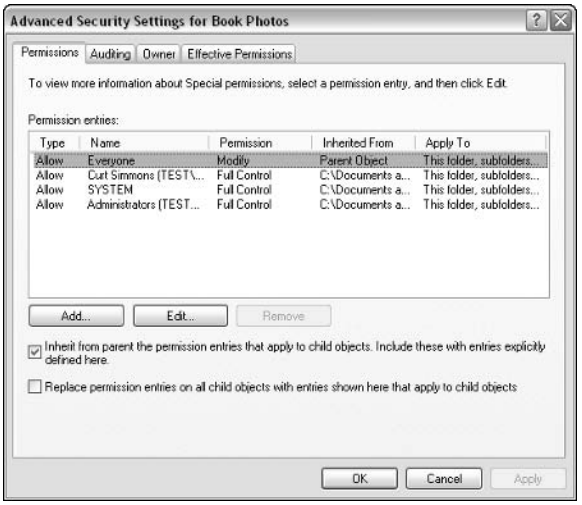

Figure 15-7: Advanced Security Settings.

5. In the Permission Entry window, shown in Figure 15-8, click the Apply onto drop-down menu and select one of the following, as applicable:

   - Apply onto this folder, subfolders, and files
   - Apply onto this folder only
   - Apply onto this folder and subfolders
   - Apply onto this folder and files
   - Apply onto subfolders and files only
   - Apply onto subfolders only
   - Apply onto files only

   After you have made your selection, click the desired check boxes to configure the permissions of the user or group. Also, note that at the bottom of the page, you can choose to apply these permissions to objects and/or containers within the existing container. When you are done, click OK and OK again to leave the Advanced settings window.

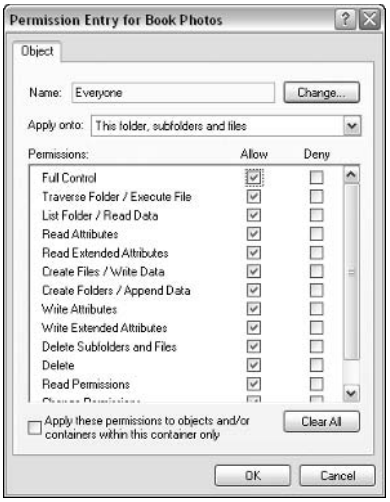

Figure 15-8: Permission Entry dialog box.

Share Level and NTFS Permissions

As you learned in the previous section, a user's effective NTFS permission is the least restrictive permission available. For example, if a user has Read, Write, and Full Control permission based on different groups, the user has Full Control permission because it is the least restrictive.

Windows XP Professional, like Windows 2000, also supports share level permissions. Share level permissions are the only permissions available for shared folders that reside on non-NTFS volumes, such as FAT or FAT32. They are a weaker form of permissions without all of the advanced options found in NTFS permissions. There are three types of share level permissions:

- **Read** – The user can view a list of what resides in the shared folder and subfolders to view data and run applications in the shared folder.
- **Change** – The user can do everything provided by Read permissions, but the user can also create files and subfolders and edit existing files. The user can also delete files and subfolders in the share.
- **Full Control** – The user can do everything provided by Read and Change, but the user can also take ownership of the folder and change any existing NTFS permissions.

You can configure share level permissions by clicking the Permissions button in the Sharing tab for the folder; this opens a basic window where you can configure the permission based on user or group, as you can see in Figure 15-9.

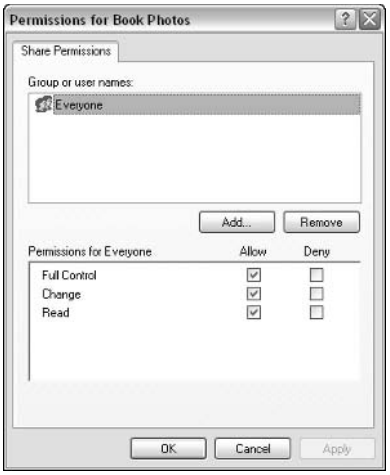

Figure 15-9: Permissions dialog box.

Like NTFS permissions, a user's cumulative share level permissions provide the effect permission. For example, if a user has Read permission due to one group membership and Full Control from another group membership, the user has Full Control over that folder.

This all sounds simple enough. However, what happens when share and NTFS permissions are mixed, which often happens? For example, say a user belongs to a group that has Read share level permission for a folder but Full Control NTFS permission. Which permission does the user get? Where combinations of share and NTFS permissions occur, the most restrictive permission is provided – which, in this case, is Read. This is the opposite of cumulative approach of NTFS permissions and Share level permissions. Keep these three points in mind:

- NTFS permissions are cumulative. When a user has several different permission for the same share, the least restrictive permission applies. The exception is Deny, which overrides all other permissions.
- Share level permissions are cumulative. When a user has several different permission for the same share, the least restrictive permission applies. The exception is Deny, which overrides all other permissions.
- When share level permissions and NTFS permissions are combined, the user receives the most restrictive permission. For example, if a user has Modify NTFS permission for a share but Read share level permission, the effective permission is Read. Also, Deny overrides everything.

Managing Caching Settings on Shared Folders

When a folder is shared on the network, you have the option of configuring a caching level for the information in that folder. This feature enables network documents to be stored locally on the user's computer in a *cache*, which is a temporary storage location. The benefit is network performance. Because cached files are stored locally, not as much information must traverse the network. Caching is not a great tool for user information that changes frequently, but for network data and files, caching can keep network traffic problems at bay, especially on networks where a lot of network files are accessed regularly.

You can configure caching on a shared folder by right-clicking the folder and clicking Properties. Return to the Sharing tab and click the Caching button. You'll see the Caching Settings window, shown in Figure 15-10. To enable caching, click the check box and choose one of the following three options from the Setting drop-down menu:

- **Automatic caching of documents** – This option is recommended for folders containing user documents; they are automatically downloaded and made available when working offline.
- **Automatic caching of programs and documents** – This option is recommended for folders with read-only data or applications that are run over the network. Opened files are automatically downloaded and made available offline.
- **Manual caching of documents** – Users must specify any files that they want to make available when working offline. The only difference here is that documents are not automatically downloaded.

Caching Settings
You can specify if and how files within this shared folder are cached locally when accessed by others.
Allow caching of files in this shared folder
Setting:
Automatic caching of documents
Recommended for folders containing user documents.
Opened files are automatically downloaded and made available when working offline. Older copies are automatically deleted to make way for newer and more recently accessed files. To ensure proper file sharing, the server version of the file is always opened.
OK
Cancel

Figure 15-10: Caching Settings.

Taking Ownership of a File or Folder

NTFS permissions give you the ownership right when you create a folder and share it on the network. You are the owner of the folder, and you have the right to set permissions on that folder for all other users who might access it. However, there may come a time when you want to transfer ownership of a folder to another user, or in the case of a local administrator, you may need to take ownership of a folder from a user who no longer manages it. In either case, Windows XP gives you a way to either transfer the ownership of a file or folder to yourself, or if you are a local administrator, you can take ownership, although you can't transfer ownership to someone else once you have forcibly taken it.

If you want to give ownership of a file or folder to another person, you can do so by accessing the special permissions option in the Advanced Security Settings dialog box, as explored in the previous sections. Open the Permissions Entry dialog box, as shown in Figure 15-11, and grant the Take Ownership permission to the desired user.

Figure 15-11: Take Ownership.

If you are an administrator and you need to forcibly take ownership of a file or folder, follow these steps:

1. Right-click the folder or file and choose Properties.
2. On the Security tab, click the Advanced button.
3. In the Advanced Security Settings dialog box, click the Owner tab.

4. On the Owner tab, you see the current owner (see Figure 15-12). Select your account or another administrator's account to change the current owner, and then click OK. Notice that you can also replace the owner on subcontainers and objects within the folder, if the object is a folder.

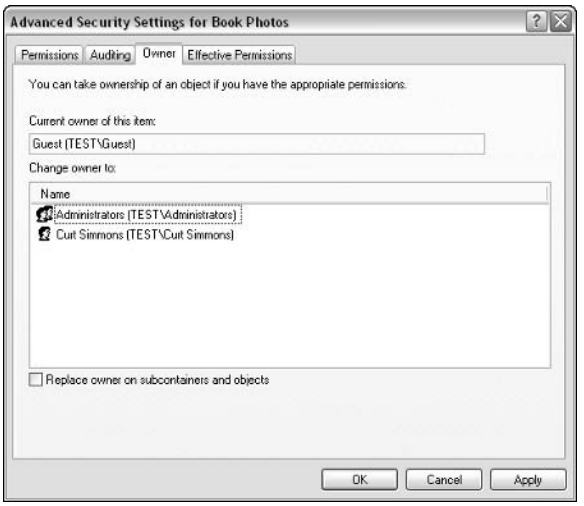

Figure 15-12: Owner tab.

Managing Shared Printers

As you work on a network, accessing and even sharing printers will more than likely be an important part of your work. Using Windows XP, you can easily connect to network printers as well as share local printers connected to your computer.

Aside from installing a local printer on a Windows XP computer, you can also configure a printer that connects to a network or Internet print device. Keep in mind that a printer is simply the software that allows you to connect to a print device, whether that print device is local, network, or even on the Internet. Additionally, you can configure several printers for the same print device that uses different configurations. You can connect to another printer on your network and print to that printer. Typically, in Microsoft networks, a certain computer functions as a print server and clients connect to that print server to use the printer. You can easily connect to a network printer by using the Add Printer Wizard in the Printers and Faxes folder. The following steps show you how:

1. Open the Printers and Faxes folder in the Control Panel. Click the Add Printer Wizard to start it.
2. Click Next on the Welcome screen.

3. In the Local or Network Printer window, select the Network printer radio button and click Next.
4. In the Specify a Printer window, shown in Figure 15-13, you have a few different options:
   - You can choose to browse for a printer. If you click this option and click Next, you see a selection window.
   - You can select a shared network printer that you see in the window, and click Next to install it.
   - If you know the Universal Naming Convention (UNC) path of the printer to which you want to connect, select the radio button option and enter the path.

   I am connecting to a computer named Writer and using the HP printer attached to it. Make your selection and click Next.

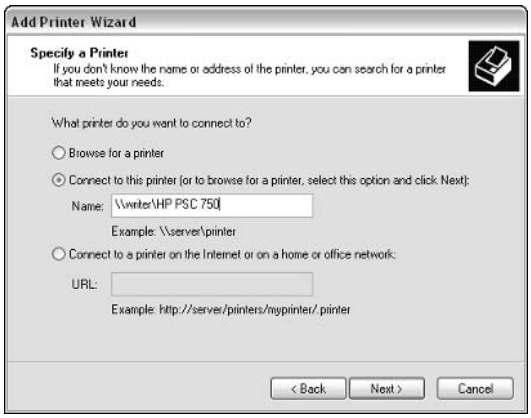
Add Printer Wizard
Specify a Printer
If you don't know the name or address of the printer, you can search for a printer that meets your needs.
What printer do you want to connect to?
Browse for a printer
Connect to this printer (or to browse for a printer, select this option and click Next):
Name: \\writer\HP PSC 750
Example: \\server\printer
Connect to a printer on the Internet or on a home or office network:
URL:
Example: http://server/printers/myprinter/.printer
< Back
Next >
Cancel

Figure 15-13: Specify a printer.

5. The printer is installed on your computer. The Test Page window appears. If you want to print a test page, choose Yes and click Next.
6. Click Finish.

Windows XP also supports printing to a print device on the Internet. The idea is that networks can use the Internet as a free print transfer network. For example, say you want to send a series of documents to a user in Spokane, Washington, but you are located in Dallas, Texas. You can use the Internet printing feature to print to an Internet-enabled printer in the Spokane office. You'll learn about configuring an Internet printer to provide Internet printing in the next section. If you want to connect to an Internet printer, use the Add Printer Wizard again, as shown in the following steps:

1. Open the Printers and Faxes folder in the Control Panel. Click the Add Printer Wizard to start it.
2. Click Next on the Welcome screen.
3. In the Local or Network Printer window, select the Network printer radio button and click Next.
4. In the Specify a Printer window, choose the option to connect to a printer on the Internet and enter the URL of the printer, as shown in Figure 15-14.

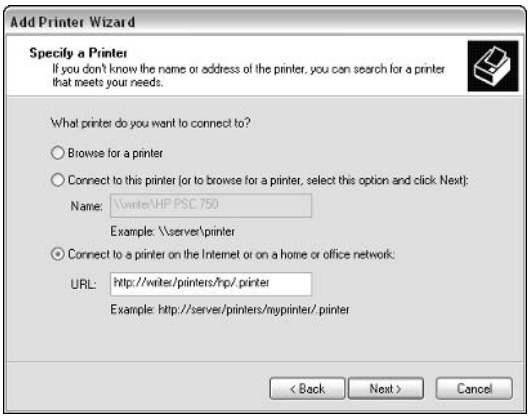
Add Printer Wizard
Specify a Printer
If you don't know the name or address of the printer, you can search for a printer that meets your needs.
What printer do you want to connect to?
Browse for a printer
Connect to this printer (or to browse for a printer, select this option and click Next):
Name:
\\writer\HP PSC 750
Example: \\server\printer
Connect to a printer on the Internet or on a home or office network:
URL:
http://writer/printers/hp/.printer
Example: http://server/printers/myprinter/.printer
< Back
Next >
Cancel

Figure 15-14: Enter the URL of the printer.

5. Click Next and click Finish.

After the printers are set up, you can print to them as you would a local printer. If you have more than one printer configured, you'll see a selection screen when you print that allows you to choose the printer to which you want to print. In Windows domain environments, users can also search the Active Directory to locate printers. Printers configured and published on Windows 2000 and XP computers are automatically published in the Active Directory. Users can search the Active Directory for certain characteristics, called attributes. For example, a user could search for laser printers and find all printers in the network that are laser printers.

If you need to print to an Internet printer, you can follow this same format, but you can also connect to an Internet printer using a browser (IE 4.0 or later only). If you know the URL, simply enter it in the address line. If you do not, enter the server's name followed by **/printers** to see a listing of Internet printers on that server. For example, say that I know the server is `http://myserver`. If I don't know the printer name, I can type **http://myserver/printers** to see a listing of printers available on that server. If you know the name of the printer, you can simply type the server name and printer name, such as **http://myserver/internetprint**, to

directly access the Internet printer. After you locate the printer you want, you can click the Connect button. Windows XP will copy the necessary drivers and the new printer will appear in your Printers and Faxes folder. This is a simple way to use a Web browser to access the Internet printer, rather than using the Add Printer Wizard to set it up.

Sharing a Printer and Managing Permissions

You can configure a local area network (LAN) printer when you install the printer using the Add Printer Wizard, or you can share the printer later once installation is complete. To configure sharing after installation is already complete, access the printer's properties and click the Sharing tab, shown in Figure 15-15. Click the Share this printer radio button and enter a desired share name in the dialog box.

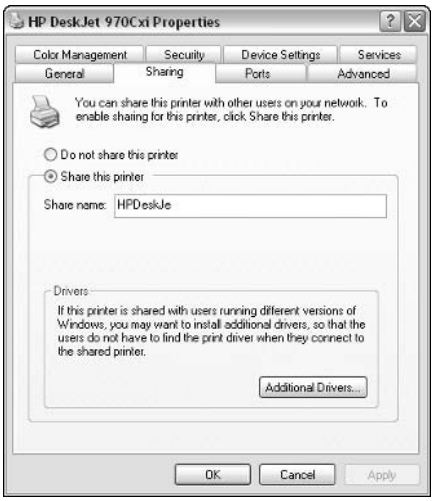
HP DeskJet 970Cxi Properties
Color Management
Security
Device Settings
Services
General
Sharing
Ports
Advanced
You can share this printer with other users on your network. To enable sharing for this printer, click Share this printer.
Do not share this printer
Share this printer
Share name:
HPDeskJe
Drivers
If this printer is shared with users running different versions of Windows, you may want to install additional drivers, so that the users do not have to find the print driver when they connect to the shared printer.
Additional Drivers...
OK
Cancel
Apply

Figure 15-15: Enter the URL of the printer.

If you have network clients other than Windows XP or 2000, you can also use this tab to install additional drivers. When a downlevel computer wants to connect to the printer, Windows XP downloads the drivers to that computer so the printer can be used. If you click the Additional Drivers button, you see a list of options, shown in Figure 15-16. Simply click the check box next to the drivers you want to install and click OK. You may be prompted to insert your Windows XP CD-ROM or asked to provide the driver you want to make available. You can usually obtain downlevel drivers from the manufacturer's Web site.

Once the printer is shared, network users can begin accessing the printer, typically using the default permissions. Aside from a LAN printer, you can also configure a printer for Internet or intranet access. This feature enables users to print to a URL and open a printer from Internet Explorer. To configure a printer so that it can

Problems Connecting to Network and Internet Printers

If you are having problems connecting to a network or Internet printer, there are a few issues to keep in mind. First, if you cannot connect to a network printer, you need to verify that the printer and server are online and that the UNC path information has not changed. If the network server is online and the UNC path information is correct, check your computer's network connectivity and connectivity to the print server using the Ping command. If you have connectivity and the server and print devices are connected and ready, you can try rebooting to restart services, or delete the printer and recreate it using the Add Printer Wizard.

For Internet printing, make sure you are using IE 4.0 or later. If you do not know the actual URL of the printer, you can access *http://servername/printers* to see what printers are available. If you know the exact URL, you can access it directly from the browser using *http://servername/printername* or you can set up the Internet printer using the Add Printer Wizard. Either way, once the printer is recognized, you can use it as if the printer is local. If you cannot connect to the Internet printer, you'll need to verify Internet connectivity and that the print server and printer are online.

be accessed via a URL, IIS must be installed on your Windows XP computer. When IIS is installed, the printer is automatically made available via Web services when you share the printer. You can think of the Internet printing options as just another way for users to access the shared printer, which can be helpful in the case of intranet printing. All permissions and related configurations apply to an Internet printer, as they do for a standard printer.

Figure 15-16: Additional driver options.

The preferred method for managing any network resource in a Windows environment is through NTFS permissions, and the same holds true for shared printers. Depending on your network needs, you may have several print devices that you want to make available to all users at all times. Or, you may have certain print devices that should be available to some users some of the time and others at other times – or not at all. The possible permission scenarios with any shared resource are many, and printer sharing is certainly no exception.

To modify a printer's permissions, you need to access the Security tab of the printer's properties pages, shown in Figure 15-17. There are three primary permissions that you can assign concerning printing:

- **Print** – This permission allows a user to print to the printer.
- **Manage Printers** – This permission allows a user to open the printer's properties pages and configure options.
- **Manage Documents** – This permission allows a user to open the print queue and manage documents.

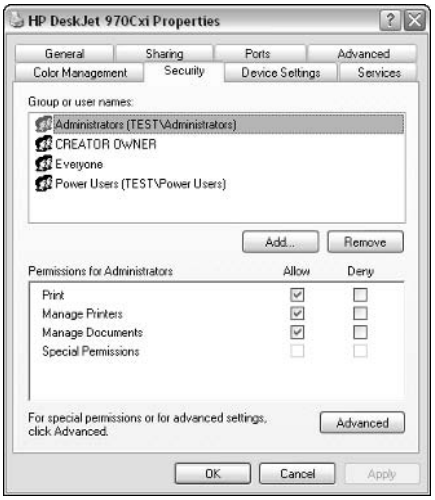

Figure 15-17: Security settings.

In Windows XP, local administrators are given all three permissions. The Creator/Owner is given the Manage Documents permission, Everyone is given the Read permission, and Power Users are given all three permissions. Obviously, most users in your environment will have Print permission for the printer, whereas only a select few will be given the Manage Printers and Manage Documents permissions.

As with all permission features, you can also click the Advanced button and view a listing of permission entries for particular groups (see Figure 15-18). You can select a desired group, click the Edit button, and you can reconfigure the default

permissions for that group, if necessary. You can also set up auditing, view the owner, and you can view the Effective permissions for a group by using the Effective permissions tab. The tabs you see here are standard, and they work for printer permissions as they do for any other shared object. Note that if no permission is expressly applied to the group, the group can inherit its permission from the Active Directory. If there is no inheritable permission, the group is simply denied access.

Figure 15-18: Permission Entry window.

As you can see, printing permissions seem rather straightforward. However, in most cases, your permission problems will not be so cut and dried. For example, say that two different groups – marketing and accounting – use a certain shared printer. You want to make sure that the accounting group can only access the printer between 3:00 and 10:00 p.m., but accounting has full access. Also, when the printer is available to both groups, how can you ensure that the accounting group's jobs are given preferential treatment? In cases such as this, you use a combination of multiple printers, different priorities, and different availability options to make the configuration work. Keep in mind that you cannot single out a group for certain time access through the security permissions available – that has to be done using multiple printers for the same print device. Fortunately, the configuration for situations like this is easy, once you determine your plan of attack.

Managing Print Queues

The process of printer configuration and setup is typically a one-time event, assuming everything works the way you want it to. However, you may have to manage the print queue from time to time to control documents. The *queue* refers to the holding area – documents that are either currently printing or are waiting to be

printed. Assuming you have permission to access the print queue on a Windows XP computer, you can do so by double-clicking the printer icon in the Printers and Faxes folders, or you can click the printer icon that appears in the Notification Area when items are being printed.

You must have permission to open, view, and modify the print queue. If you do not, an access denied message appears if you try to open the printer in the Printers and Faxes folder, and you will not see a printer icon in the Notification Area.

The print queue gives you a listing of documents that are printing or are waiting to be printed (see Figure 15-19). You can manage the print queue in a few ways:

- You can click the Printer menu and choose Pause Printing or Cancel all Documents. The pause feature is good if you need to perform maintenance on the printer without deleting everything that is waiting in the queue.
- You can use the Document menu to manage individual documents. For example, you can select a document and click the Document menu, where you can Pause, Resume, Restart, or Cancel the document's print. These features can be helpful if a document seems to be stuck in the queue—you can cancel it and the other documents waiting should resume printing.
- You can also easily perform these same actions by simply right-clicking on the document icon in the print queue.

Figure 15-19: Print queue.

You can also make a few adjustments to a document's printing by right-clicking the document and clicking Properties. As you can see in Figure 15-20, you have a standard properties sheet with several tabs. The noteworthy items are found on the General tab. You can change the priority of the document in the queue. Under most circumstances, documents are set to a priority of 1. What if there are 15 documents in the print queue, but one particular document needs to be printed first? Just

access the document's properties and change the priority setting to Highest – this will ensure that the document prints first, assuming no other documents have a Highest setting.

Also, notice that you can configure a schedule for a particular print job. Say that someone in a certain group in your office has sent a 300-page report to the printer during peak printing hours. You can access the document's properties and change the time restriction so that the job is held in the queue until after hours. In larger networks, managing print queues can be very important. After all, you have the power to pause, restart, delete, and even reorder jobs in the print queue. Many larger networks have administrators whose sole job is to manage printing and solve problems with network printers and printing bottlenecks.

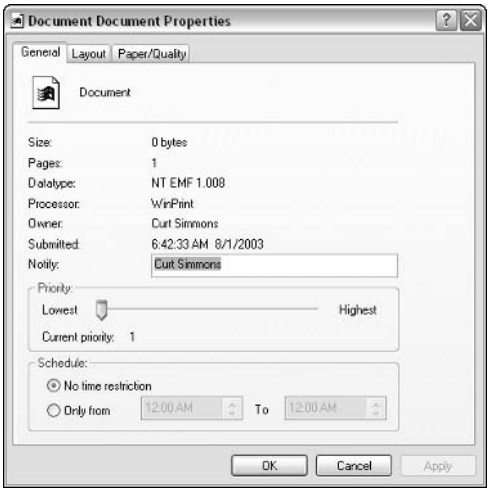

Figure 15-20: Print Document Properties.

Chapter 16

Auditing and Disk Quotas

IN THIS CHAPTER

- Auditing your Windows XP computer
- Configuring Disk Quotas

WINDOWS XP GIVES YOU a number of management tools for a variety of tasks and features. This chapter explains two of those features that you may find helpful if your computer is connected to a network: auditing and disk quotas. In a network environment, users may access your computer in a number of ways. You might even have user folders on your computer in a file server manner where users can store files. Using Windows XP's auditing features, you can keep track of what users are doing on your computer by auditing different events, including logon events and even access to different objects, or shared folders. If you allow users to store data on your computer from the network, you can use disk quotas to manage storage space more effectively. These features are rather easy to use and can be quite helpful in a variety of situations.

Auditing in Windows XP

Windows XP Professional gives you the ability to audit security events on your Windows XP system. This feature enables you to see what users are doing and/or accessing. When you turn on auditing for the desired events, the audit data is recorded to the Security Log, which is available in Event Viewer. The primary use for auditing is security. For example, you can audit failed logon events so that you can detect possible attacks on your computer, or you can audit shared folders so you can detect possible inappropriate use. In other words, auditing is a protective measure that can help increase security on your computer by alerting you of suspicious behavior.

You can audit the following items in Windows XP:

- **Account Logon events** – This option audits each instance of a user logging on to or logging off the system from another computer where your computer is used to validate the account.
- **Account Management** – This option audits account management tasks, such as creating, deleting, or changing users and group accounts.

- **Directory Service Access** – This option audits the access of an Active Directory object that has its own system access control list.
- **Logon Events** – This option audits logon events, such as a user logging on or off, or making a network connection to your computer.
- **Object Access** – This option audits access to some object in Windows XP, such as a file, folder, registry key, printer, or other object. The object must have its own system access control list.
- **Policy Change** – This option audits any local policy change or audit policy change, and changes to user rights assignments.
- **Privilege Use** – This option can audit each instance of a user exercising a user right.
- **Process Tracking** – This option can audit detailed tracking information for different system processes.
- **System Events** – This option can audit when a user invokes a system event, such as a restart, shutdown, or any other event that affects the system security log or the security log.

You probably won't want to use all of the audit features available, and, for the most part, the common use of auditing is to audit logon events, system events, and objects. But you do have all of these options available to you should you need more auditing policies configured on your system.

Keep in mind that auditing, like anything else, uses system resources to run. Each time an auditing event occurs, it must be written to the System Log, which you then use to view auditing events. A lot of writing to the system log can degrade Windows XP performance, so do not turn on auditing features unless you really intend to use them because they can put a drain on system resources.

As mentioned previously, when you enable auditing, auditing events are written to the system log, which you can then view using Event Viewer. Auditing basically works through Access Control Lists (ACLs), which are used to determine who can access what on Windows XP. You enable auditing on the Local Security Settings console. Because Windows XP Home editing doesn't provide a Local Security Settings console, you can't audit events on Windows XP Home edition.

Configuring Auditing

To configure auditing, you must access the Local Security Settings console. You can access the console by opening Control Panel → Administrative Tools, then double-clicking the Local Security Policy console. Or, you can click Start → Run and type **secpol.msc** and click OK. Either way, the Local Security Settings console opens. Expand Local Polices in the left console pane, and select Audit Policy. The policies appear in the right pane, as shown in Figure 16-1.

To configure auditing, you'll need to be logged on as a local computer administrator.

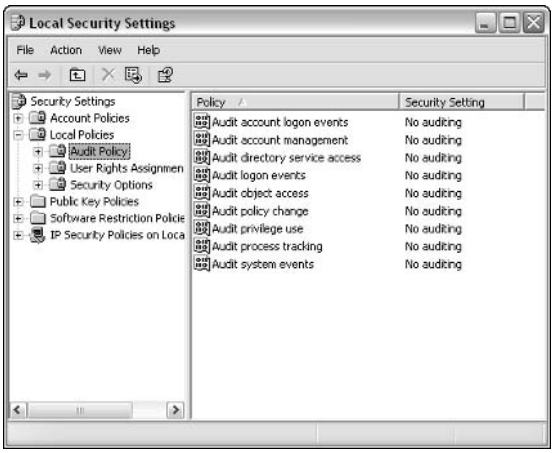

Figure 16-1: Local Security Settings console.

To turn on auditing for a policy, double-click the policy in the right console pane. For each policy, you can determine whether you want to audit success, failure, or both, as you can see in Figure 16-2. As a general rule, you'll want to mainly audit failure. For example, if you audit Logon Events, you probably want to see the failure of logon events in Event Viewer, rather than each successful logon. The choice is yours, but keep in mind that if you audit successes, each successful event will have to be written to the Security Log. To enable the policy, simply select the check boxes you want and click OK.

Figure 16-2: Audit logon events Properties.

As you enable the policies you want, the Security Setting option found in the Local Security Settings right console pane will reflect your change.

If you are in a Windows domain, site, domain, or OU, policies may prevent you from configuring auditing on your local computer. Consult your network administrator for more information if access to the Local Security Policy console seems to be restricted, even though you are logged on with a local administrator account.

Setting Up Objects for Auditing

If you want to audit access to objects, such as files, folders, and printers, you must first enable auditing of objects in the Local Security Settings console (see the previous section). After you have enabled auditing of object access, you can configure each file, folder, printer, or other object of auditing, as desired. Keep in mind that turning on auditing of object access in the Local Security Settings console simply enables the feature—you must configure each object you want to audit for auditing.

Auditing will not work with Simple File Sharing turned on, so you'll need to turn off Simple File Sharing so you can actually access security settings for the object. (See Chapter 15 to learn more about Simple File Sharing.) Then, access the object's properties by right-clicking the object and clicking Properties. On the Security tab, shown in Figure 16-3, click the Advanced button.

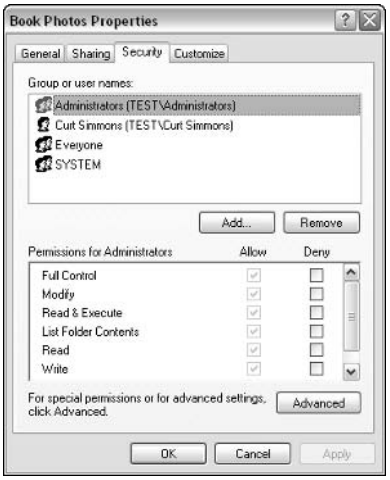

Figure 16-3: Click the Advanced button on the Security tab.

The Advanced button takes you to the Advanced Security Settings window for the object. Follow these steps to enable auditing:

1. In the Advanced Security Settings window, click the Auditing tab, shown in Figure 16-4.

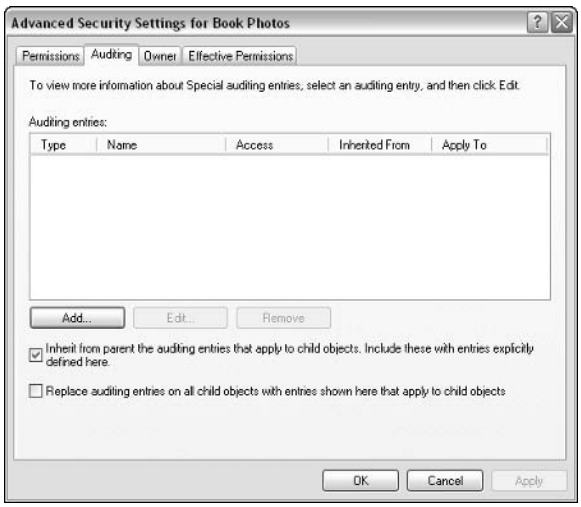

Figure 16-4: Auditing tab.

2. Click the Add button.
3. In the Select User or Group window, enter the users and groups that you want to audit for this object, as shown in Figure 16-5. You can click the Advanced button if you want to choose them from a list. When you are done, click OK.

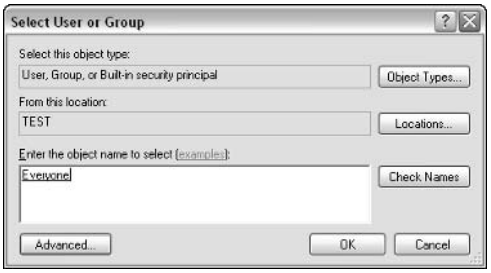

Figure 16-5: Select User or Group.

4. The Auditing Entry dialog box appears, as shown in Figure 16-6. Enable the check boxes for Successful or Failed for each kind of access you want to audit on this object. Click OK when you are done.

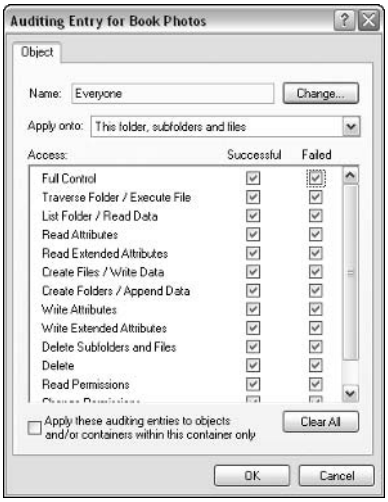

Figure 16-6: Auditing Entry.

5. The entry now appears on the Auditing tab. Click OK, then OK again to exit.

Keep in mind that you use these same steps, regardless of the object you want to audit. The auditing entries will change, depending on the object, of course. As you can see in Figure 16-7, the Auditing Entry window for a printer gives you access options pertaining to the printer that you can audit. This feature will help you see who is accessing the printer, or the number of times a print job has failed.

Figure 16-7: Auditing Entry for a printer.

Using Event Viewer to View the Security Log

After you have configured auditing policies, you can view events pertaining to those policies with the Security Log. You can review the Security Log using Event Viewer, which you can access from the Applications folder in the Control Panel, or via the Computer Management console. The following steps show you how to use Event Viewer to access the Security Log.

1. Open Event Viewer. In the left console pane, double-click the Security Log option. In the right console pane, shown in Figure 16-8, you see log entries for either successful or failed audits, depending on your configuration.
2. To view more information about an audit, double-click it in the right console pane.

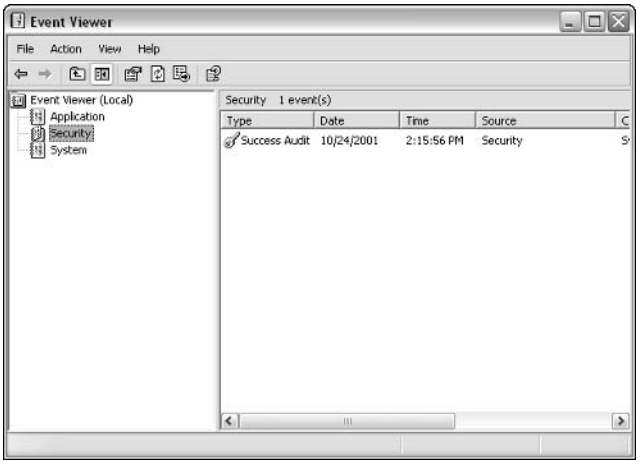

Figure 16-8: Use the Security Log to access auditing events.

3. As you can see in Figure 16-9, an Event Properties window opens, where you can view the date, time, category, type, event ID number, user, and computer concerning the audit. You can move through different events using the arrows on the right side of the window, as desired.

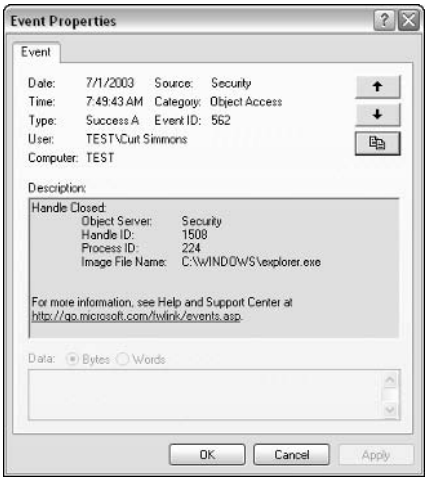

Figure 16-9: Event Properties window.

Inheritance and File and Folder Auditing

In Windows XP, the concept of inheritance makes your use of files and folders easier. For example, say that a folder contains 10 files. Using inheritance, you can set permissions on that folder, and all of the contents of the folder inherit those permissions. This keeps you from having to set permissions on the folder itself, then on each individual file in the folder.

The same concept holds true for auditing. When you set auditing on a parent folder, all subfolders and files within that parent folder automatically inherit the auditing settings of the parent. However, what if you have a parent folder you want to audit, but there is a collection of 10 subfolders that you don't want to audit within the parent folder? No problem; you can simply block inheritance on the folder so that auditing settings are not passed on to child folders. Access the Auditing tab as you would to configure auditing, but look at the bottom of the tab and you'll see an Inherit from parent the auditing entries that apply to child objects check box. Clear the check box to turn off inheritance for the audited parent folder. This will solve your inheritance headaches.

Using Disk Quotas

Disk Quotas is a feature that enables you to control user storage capabilities. For example, say you are using Windows XP as a file server and user storage center. You want to have users store files and folders on the shared hard disk, but you do not want users storing more than 500 MB of data. This restriction keeps users from wasting a lot of disk space storing items they no longer need. Using Disk Quotas, you can easily configure this restriction. When users begin running out of storage space, they will receive warning messages. Depending on your configuration, users can even be prevented from storing data until they have removed old data to stay below the 500 MB limit. As you can imagine, disk quotas can be very helpful in a variety of circumstances, and they can help force users to conserve disk space when users are storing files on local computers.

Before you can use Disk Quotas, note that quota management only works on NT File System (NTFS) volumes. Also, users cannot compress data to store more than their quota limits. Disk Quotas are available on the Quota tab found on the disk's Properties dialog box. You can enable disk quota management on the Quota tab by clicking the Enable quota management check box, shown in Figure 16-10.

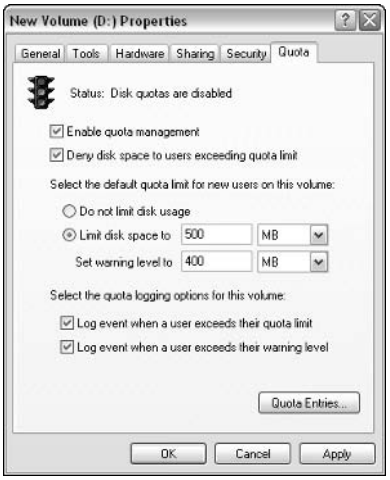

Figure 16-10: Quota tab.

Once you enable quota management, a few configuration options are available to you:

- Quota management can be used to deny disk space to users who exceed the quota limit, or it can be used to warn users without actually denying them disk space. If you want to strictly enforce quota management, you can choose the deny option by clicking this check box.
- Set the amount of disk space a user can have in the quota and a warning level. The warning level is generally an amount slightly lower than the quota. Once the warning level is met, the event is logged in the Event Log.
- You can use the final two check boxes to log events to the event log when users exceed their storage limits or reach the warning level. These options are not available by default, but you can enable them if you like.

After quotas are enabled on a disk, they apply uniformly to all network users who store data on the disk. However, what if you need an exception? What if you need to give certain users unlimited access while giving other users even more restrictive access? In this case, you can create a quota entry for that user. A quota entry further defines the user or groups quota and overrides any existing general settings configured on the Quota tab.

To configure a quota entry, just follow these steps:

1. On the Quota tab, click the Quota Entries button. This opens the Quota Entries window, as shown in Figure 16-11.

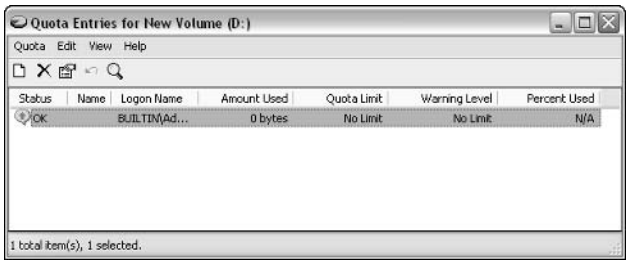
Quota Entries for New Volume (D:)
Quota Edit View Help
Status Name Logon Name Amount Used Quota Limit Warning Level Percent Used
OK BUILTIN\Ad... 0 bytes No Limit No Limit N/A
1 total item(s), 1 selected.

Figure 16-11: Quota Entries.

2. Click Quota → New Quota Entry.
3. This opens a search window, shown in Figure 6-12, where you can search for and select the user that you want to add. When you have selected the user, click the OK button.

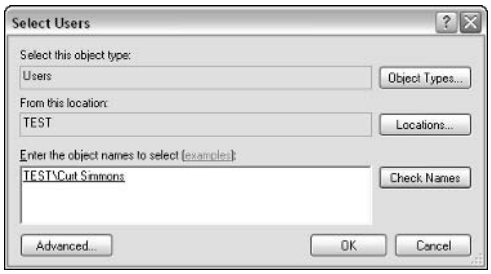

Figure 16-12: Select Users.

4. The Add New Quota Entry window appears, as shown in Figure 16-13. You can choose not to limit disk space, or you can set the quota and warning level for that particular user. This feature allows you to have flexibility for users who need more storage space.

Figure 16-13: Select users.

5. The new entry appears in the Quota Entries window. You can edit and change the entry at any time using this console.

Chapter 17

Backing Up and Restoring Data

IN THIS CHAPTER

- Understanding backup concepts
- Creating backup jobs
- Restoring a backup

BACKING UP DATA IS one of those tasks that most of us fail to think much about. After all, it is much more fun to work on Windows XP than spend time thinking about data backup. However, in the case of a failed hard drive or an operating system that goes crazy and refuses to work again, the issue of data backup becomes paramount. After all, there is nothing worse than losing data, whether it is work documents or your vacation digital photos. Windows XP Professional provides you with backup and restore tools that you should get to know and put to work often. This chapter considers the issues of backup and restore and shows you how to make sure your data is safe.

Understanding Backup Options in Windows XP

One of the great things about Windows XP's backup features is they are easy to use – it is simply a matter of your putting them to work to ensure that your data is always safe and secure. The backup and restore wizards you'll find in Windows XP were first introduced in Windows 2000, and they are more flexible than the original backup tools seen in earlier versions of Windows.

My best piece of advice is to organize yourself and create an effective backup plan that protects your data. Computer hardware fails all of the time, and you simply never know when a computer's hard disk may crash. This is even true of newer computers that you may think of as safe. I would liken computers to new cars: You never want to drive off the lot without insurance, and you never want to store data on a PC without an effective backup plan just in case something should happen.

An effective backup plan doesn't have to take up a lot of your time and a lot of storage media, but it does require a bit of forethought and planning. The next few sections explore the issues you should consider.

I often get mail from users who have Windows XP Home edition, asking where the backup utility is on their computer. Windows XP Home edition does not ship with the backup utility installed. However, it is lurking around in the Home edition installation CD-ROM. If you want to install it, just navigate to `\valueadd\msft\ntbackup`. The file that you install is NTBACKUP.MSI. Once you install the backup utility, it should work according to this chapter's instructions.

Types of Backup

Windows XP Professional supports several different types of backups, all of which can be performed on NT File System (NTFS) and file allocation table (FAT) drives. You should be familiar with these so you can formulate your own backup plan.

- **Normal** – A normal backup backs up all selected files and marks them as having been backed up. All files you select are backed up, regardless of their previous backed-up state. This type of backup is also known as a *full backup* and is the type of backup you initially use to back up data. Because the normal backup is actually backing up all data you select, it can take some time to complete.
- **Incremental** – An incremental backup backs up all selected files that have changed since the last backup. Commonly, a normal backup is performed, followed by several incremental backups, which only back up the changes. This backup strategy reduces overall backup time and storage space.
- **Differential** – A differential backup is the same as an incremental backup, but the files backed up are not marked as having been backed up. The result is that a differential backup may re-backup files that have not changed because they were not marked. The difference between an incremental backup and a differential backup is recovery. A differential backup takes longer than an incremental backup, but in the event of a failure, you only need to run the normal backup job for recovery with the last differential backup. If you use an incremental backup job, you have to recover the normal backup and every incremental backup that was created since the last normal backup.

- **Copy** – A copy backup backs up selected files without marking them as having been backed up. This option is useful when you want to back up certain files in between normal and incremental backups without altering the incremental backup jobs.
- **Daily** – This backup backs up all selected files that have changed during the day without marking them as having been backed up.

Once you consider the kinds of backup jobs and commit them to memory, you'll need to understand how they are typically used. First of all, a normal backup simply backs up all files you select. You can perform a normal backup and create a new backup file every day if you like, but the problem comes down to time. A normal backup takes more time than other types of backups, so people who use their computers a lot and have a significant amount of data to back up find the normal backup too time consuming to run every day.

Since normal backups are too time consuming to run every day, most people run a normal backup at a certain interval, then either an incremental or differential backup every day between normal backups. The main difference between incremental and differential backups is in backup and restore time. When you run an incremental backup, it only backs up the changes of selected files. For example, say you run a normal backup on Monday, and an incremental backup on Tuesday, Wednesday, Thursday, and Friday. Should a failure occur, you would restore Monday's normal backup, then every incremental backup since then. Incremental backups take less time during the backup process because they only back up changes. However, during a restore situation, you have to restore the normal backup and all incremental backups to get your data back, which can be time consuming and tedious.

A differential backup, on the other hand, simply backs up all data that has changed since the last normal backup. Because it is backing up all changes, the backup process takes longer, but restoration is faster. Say you perform a normal backup on Monday, then a differential backup on Tuesday, Wednesday, and Thursday. If you have hard disk failure and need to restore the system on Friday, you only need to run Monday's backup and Thursday's backup. The choice comes down to time. If you want to spend less time backing up, use a normal backup and incremental backups. If you want to spend less time restoring, use a normal backup and differential backups.

Formulating Your Backup Plan

Once you understand the basic features of backing up, you'll need to formulate a backup plan to follow. Overall, your backup plan should consider the urgency of data recovery, the amount of time you want to spend backing up data, and how critical that data is. For example, many users who want to make sure that their systems are backed up run a normal backup every Monday and either incremental or

Backup Media

Windows XP creates a backup file with a *.bkf extension when you run a backup job. So, when you store the backup file, you'll be dealing with one file, not a bunch of copies of files and folders from your operating system. You can store the backup file in any location you like, such as a removable media drive (CD, Zip, and so on), or you can invest in a tape drive and back the file up to tape. A number of affordable tape drives are on the market today that will work well with Windows XP. One important note here is that you cannot directly back up to a CD within the backup utility, but you can create the backup file, save it on your system, and then burn it to a CD as you would any other file.

Overall, when you create the backup file, think carefully about where you store it to ensure that the backed-up data is safe. Some people even store backup files off-site, such as in a safety deposit box. What you will need depends on the critical nature of your data.

differential backups each day thereafter. However, if the data on your Windows XP computer is not that critical, you might run a normal backup every few weeks and incremental backups in-between. The key is simply to think about how critical your data is, how readily available it must be for restoration, and how much you want to invest in backing up data. The plan you choose to follow depends on your needs. Think carefully about your options and then create a backup plan that is right for you.

Understanding System State Data

System State Data refers to a collection of system data that you can back up so that you can restore your Windows XP computer in the event of a failure. Instead of having to back up individual system components, you can simply choose to back up System State Data, which will back up the following items:

- The Registry
- COM+ Class Registration database
- Boot files, including the system files
- System files that are under Windows File Protection

If you are thinking that Windows XP's System Restore feature keeps you from having to worry about backing up, think again. System Restore only restores operating system files and functions in order to fix an operating

system that is not working properly. It does not provide any protection for your personal files and data, so don't depend on System Restore to protect you. You can learn more about System Restore in Chapter 19.

Creating a Backup Job

When you are ready to create a backup job, you can easily do so using Windows XP's Backup utility, where you can use a wizard to guide you through the backup process. To create a backup job, just follow these steps:

1. Click Start → All Programs → Accessories → System Tools → Backup.
2. The Backup Wizard appears. Click Next on the Welcome screen.
3. In the Backup or Restore window, choose the Back up files and settings radio button and click Next.
4. In the What to Back Up window, shown in Figure 17-1, you can choose to back up everything on the computer, selected files, drives, or network data, or System State data. Make a selection and click Next.

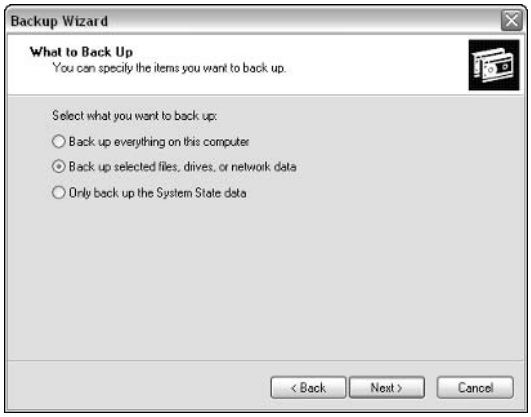
Backup Wizard
What to Back Up
You can specify the items you want to back up.
Select what you want to back up:
Back up everything on this computer
Back up selected files, drives, or network data
Only back up the System State data
< Back
Next >
Cancel

Figure 17-1: Choose what to back up.

5. If you choose to back up selected files, drives, or network data, the Items to Back Up window appears, as shown in Figure 17-2. In this Explorer-based window, browse in the left pane and select the files that you want to back up in the right pane. Click Next.
6. In the Backup Type, Destination, and Name window, choose a backup location and give the backup job a name. Click Next.

7. In the Completion window, click the Advanced button instead of clicking Finish.
8. In the Type of Backup window, use the drop-down menu and choose either Normal, Incremental, Differential, Copy, or Daily backup, as shown in Figure 17-3.

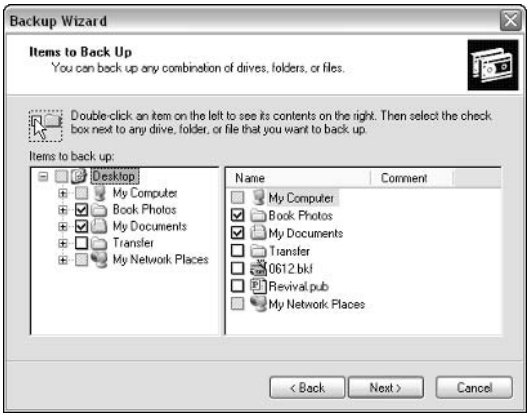

Figure 17-2: Items to back up.

Backup Wizard
Type of Backup
You can choose the type of backup that fits your needs.
Select the type of backup:
Normal
Description
Backs up selected files, and marks each file as backed up.
< Back
Next >
Cancel

Figure 17-3: Items to back up.

9. In the How to Back Up window, you can choose to verify data after backup, use hardware compression (if available), and disable volume shadow copy (which allows a backup to occur even if the file is currently being written to), as shown in Figure 17-4. Click Next.

10. In the Backup Options window, shown in Figure 17-5, you can choose to append this backup job to an existing backup job or replace an older backup job. Also note that you can allow only the owner and administrator to have access to the backup (if you are overwriting an older job). Make your selection and click Next.

11. In the When to Back Up window, you can choose to run the backup job now or at a scheduled time. Make any desired selections and click Next.

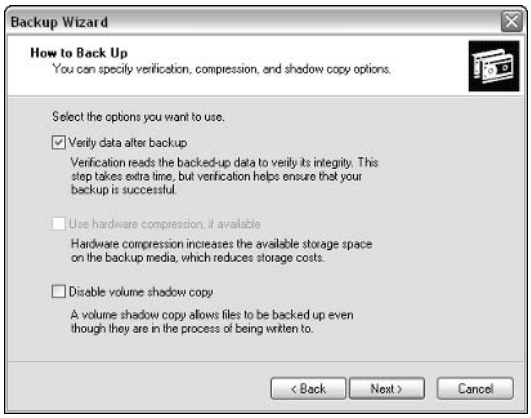
Backup Wizard
How to Back Up
You can specify verification, compression, and shadow copy options.
Select the options you want to use.
Verify data after backup
Verification reads the backed-up data to verify its integrity. This step takes extra time, but verification helps ensure that your backup is successful.
Use hardware compression, if available
Hardware compression increases the available storage space on the backup media, which reduces storage costs.
Disable volume shadow copy
A volume shadow copy allows files to be backed up even though they are in the process of being written to.
< Back
Next >
Cancel

Figure 17-4: How to back up.

Backup Wizard
Backup Options
You can specify whether to overwrite data, and whether to restrict access to your data.
If the medium you are using to back up your data already contains backups, choose one of the following options:
Append this backup to the existing backups
Replace the existing backups
The following option is available only if you are replacing the existing backups.
Allow only the owner and the Administrator access to the backup data and to any backups appended to this medium
< Back
Next >
Cancel

Figure 17-5: Backup Options.

12. Click Finish. The Backup Progress window shows the status of the backup, as shown in Figure 17-6. Click Close when the job is complete.

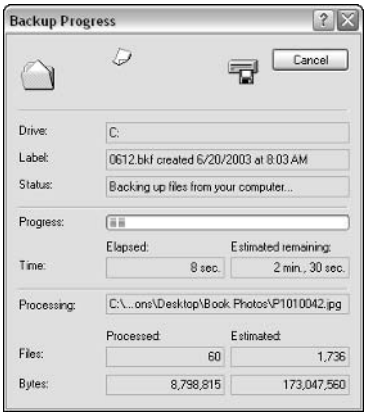

Figure 17-6: The backup is created.

Once you have created the backup job using the wizard, you may find that simply creating the job manually is a bit faster. Windows XP gives you this option. Basically, you can manually configure everything the wizard presents to you, but you do it on one selection tab. The following steps show you how to create a backup job without having to use the Backup Wizard.

1. Click Start → All Programs → Accessories → System Tools → Backup.
2. In the Backup Utility window, click the Backup tab, shown in Figure 17-7. If the Backup Wizard begins automatically, click the Advanced Mode link on the first window; this will take you to the Backup Utility. In the left pane, choose what you want to back up. Note that you can choose System State data found under the My Computer category. Make your selections and click the Start Backup button.
3. In the Backup Job Information window, you'll see the option to enter a backup description and append or replace former backup jobs, as shown in Figure 17-8. Make any desired changes.
4. If you click the Schedule button, you can create a schedule for when the backup should start. Also note that you can click the Advanced button and choose the Advanced backup options you saw when using the wizard, such as verification and backup type, shown in Figure 17-9. Make any desired changes and click OK.
5. Click the Start Backup button to begin the backup job.

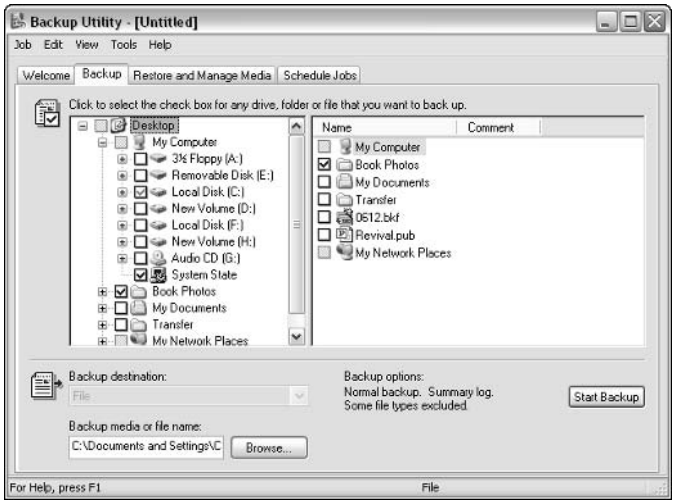

Figure 17-7: Choose what you want to back up.

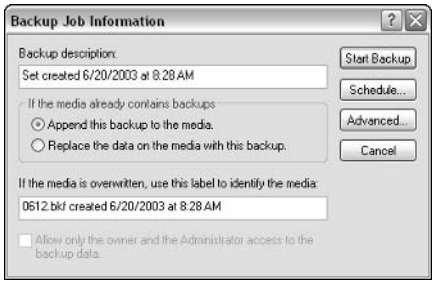
Backup Job Information
Backup description:
Set created 6/20/2003 at 8:28 AM
If the media already contains backups:
Append this backup to the media.
Replace the data on the media with this backup.
If the media is overwritten, use this label to identify the media:
0612.bkf created 6/20/2003 at 8:28 AM
Allow only the owner and the Administrator access to the backup data.
Start Backup
Schedule...
Advanced...
Cancel

Figure 17-8: Backup Job Information.

Advanced Backup Options
Back up data that is in Remote Storage.
Verify data after backup.
If possible, compress the backup data to save space.
Automatically backup System Protected Files with the System State.
Disable volume shadow copy.
Backup Type:
Normal
Description
Backs up selected files, and marks each file as backed up.
OK
Cancel

Figure 17-9: Backup details.

Scheduling a Backup Job

The Backup Utility has a Schedule Jobs tab, shown in Figure 17-10. This tab gives you a calendar view where you can simply double-click dates or click the Add Job button to create a job. After you double-click a date or click Add Job, the Backup Wizard begins, and you can schedule a backup job for that day. You can complete this process over and over for different days so that you can schedule a series of backup jobs at one time. This feature allows your operating system to handle the backups automatically on the desired date and time you configured.

Backup Utility - [Schedule Jobs]
Job Edit View Tools Help
Welcome Backup Restore and Manage Media Schedule Jobs
Today
July, 2003
Sun Mon Tue Wed Thu Fri Sat
29 30 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31 1 2
3 4 5 6 7 8 System Event
Add Job
For Help, press F1

Figure 17-10: Schedule Jobs.

Restoring Data

In the event of user data, system state data, or a complete operating system failure, you can use the backup jobs that you have created to restore the data to the computer. In the event of a disk failure or operating system failure, you can reinstall Windows XP, and then use your backup jobs to restore the data or the complete operating system that has been saved in your backup jobs. As with backing up data, you can also restore data with the help of a wizard.

When you restore data, you choose the backup file that you want to restore using the Restore Wizard (or you can use the Restore and Manage Media tab on the Backup Utility, shown in Figure 17-11). You can choose to restore the data to its original location or you can choose a different location.

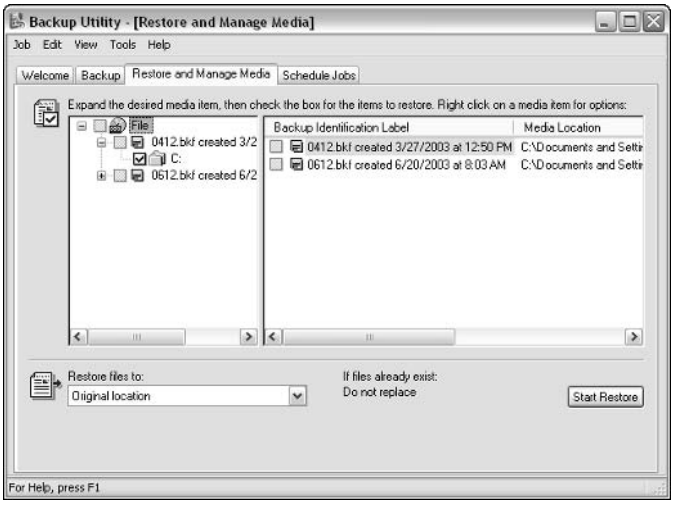
Backup Utility - [Restore and Manage Media]
Job Edit View Tools Help
Welcome Backup Restore and Manage Media Schedule Jobs
Expand the desired media item, then check the box for the items to restore. Right click on a media item for options:
File
0412.bkf created 3/2
C:
0612.bkf created 6/2
Backup Identification Label
Media Location
0412.bkf created 3/27/2003 at 12:50 PM C:\Documents and Settir
0612.bkf created 6/20/2003 at 8:03 AM C:\Documents and Settir
Restore files to:
Original location
If files already exist:
Do not replace
Start Restore
For Help, press F1

Figure 17-11: The Restore and Manage Media tab.

You may find it helpful to use the Restore Wizard for your first restore run. Depending on your backup strategy, you may need to run several restores in a row using your Normal and Differential or Incremental backups. The following steps show you how to use the Restore Wizard.

1. Click Start → All Programs → Accessories → System Tools → Backup.
2. In the Backup Utility window, click the Restore Wizard button found on the Welcome tab.
3. Click Next on the Restore Wizard Welcome screen.
4. In the What to Restore window, shown in Figure 17-12, expand File in the left portion of the window, select what you want to restore, and then click Next.
5. In the completion window, click the Advanced button instead of clicking Finish.
6. In the Where to Restore window, you can choose to restore the files to the original location, an alternative location, or a single folder. This feature works well if you need to restore data but don't necessarily want to restore it to its original location. Make a selection from the drop-down menu and click Next.
7. In the How to Restore window, shown in Figure 17-13, you can choose to leave your existing files, replace existing files if they are older than the backup files, or replace existing files. Make sure you understand the full ramifications of your decision if you choose to replace existing files. Make a selection and click Next.

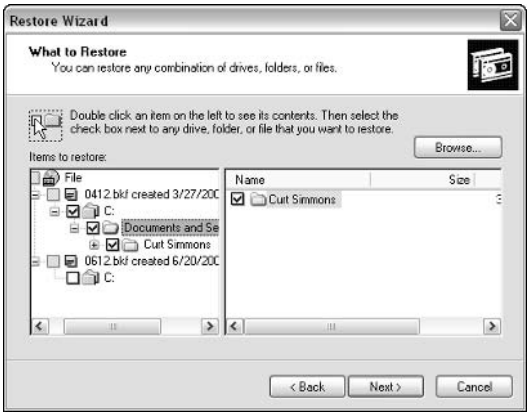

Figure 17-12: The What to Restore window.

Restore Wizard
How to Restore
You can choose how you want to restore files that are already on your computer.
When restoring files that already exist on your computer:
Leave existing files (Recommended)
Replace existing files if they are older than the backup files
Replace existing files
< Back
Next >
Cancel

Figure 17-13: Choose how to restore.

8. In the Advanced Restore Options window, you can choose to restore security settings and junction points and preserve existing volume mount points. All of these items are selected by default. Click Next.
9. Click Finish to begin the restore.

About Automated System Recovery

Automated System Recovery (ASR) is an option you see on the Backup Utility's Welcome tab. ASR is a process that backs up your system partition so that it can be restored in the event of a catastrophic failure. However, it is important to note that ASR doesn't restore everything, and the process isn't exactly automated as one might think. You can use ASR to back up your system partition, but you'll also need to use the Backup Wizard to back up all of your files and folders (you can choose the Back up everything on my computer option). Essentially, ASR is helpful only if you have prepared a full backup in advance.

To use ASR, create a full backup to tape or another media, and then run the ASR Wizard. In the event of a catastrophic failure, you can start your computer using the Windows XP installation CD, then press F2 to run ASR. Follow the prompts that appear.

Note that ASR doesn't work on Windows XP Home edition.

Chapter 18

Monitoring and Managing System Performance

IN THIS CHAPTER

- Using Windows XP's Performance tool
- Managing hard disks
- Managing memory and the processor
- Using Scheduled Task

As with any computer operating system, it's a good idea to both monitor and manage Windows XP's performance so that you can keep it in good working condition. Windows XP is easier to monitor and gives you more performance configuration options than has been possible with earlier Microsoft operating systems. However, Windows XP is a real powerhouse and consumes a lot of power. Take a look at the features and issues explored in this chapter so you can monitor performance and get the most out of Windows XP.

Performance

Windows XP contains a Performance tool that works well and can be helpful in providing you with specific information about the performance levels of various services and hardware running on Windows XP.

Windows XP's Performance tool was once called Performance Monitor, and iterations of the tool have been around since the days of Windows NT without much change.

Performance can provide you with information in a chart, report, or histogram format. You can also log data to a log file and configure administrative alerts. Administrative alerts can be sent in the following forms:

- An entry to the application event log
- A network message
- Starting a performance data log
- Running a program

Because the Performance tool works on a counter basis, you can individually choose what you want to monitor. That's good news because the tool can help you isolate specific problems.

Performance monitoring doesn't fix any problems; it simply monitors your system in a way that you can discover the cause of existing problems. The purpose of performance monitoring is to gain information about the performance of various system components and hardware, such as memory and processor utilization. Typically, the Performance tool is best used with a baseline of performance. This means that you monitor performance over a period of time during peak and non-peak times to determine the baseline that the component functions under. You'll record high and low peaks of performance, and you can effectively determine what is normal and satisfactory for that component. With the baseline, you can later use the Performance tool to see if the component is functioning within normal parameters. If it is not, you know that a problem exists with the component, or perhaps the load placed on the component has increased. Either way, you can effectively identify what component is unable to keep up with the demand placed on it, which is commonly called a *bottleneck*.

Performance functions through the use of objects, counters, and instances. In Performance, *objects* represent certain performance categories, such as memory, physical disk, processor, and related categories of system components and hardware that can be monitored. Under each object are specific counters that you can monitor. *Counters* represent what you are actually monitoring under that object, such as bytes per second. Some objects have only a few counters, depending on what can be monitored, while others may have 10 or more. The idea is to provide you with specific counters so that you can monitor specific object actions. For example, you can monitor the memory object, the available bytes counter, and the pages-per-second counter to gain information about memory availability and current usage, or you can use a combination of a number of other memory counters. When you choose to monitor a counter, you monitor an *instance* of the counter.

Getting to Know Performance

If you click Start → Control Panel → Administrative Tools → Performance, the Performance tool opens, as shown in Figure 18-1.

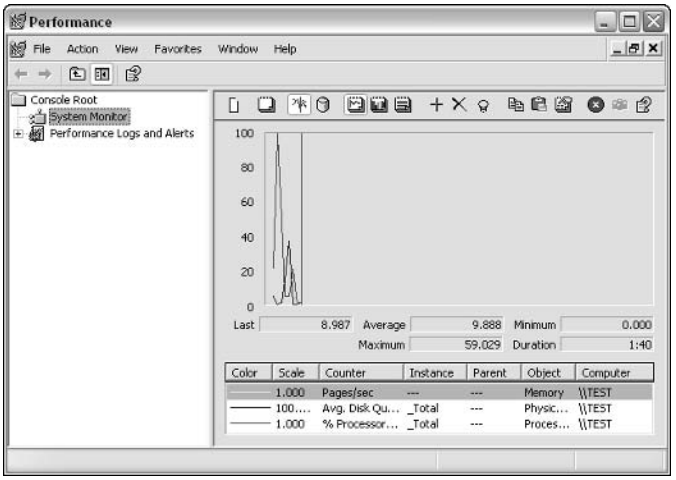

Figure 18-1: Performance tool.

As you can see, the Performance tool is a basic MMC interface. The left console pane contains the System Monitor node and the Performance Logs and Alerts node. However, you primarily interact with the Performance tool by using the right console pane. There are three basic divisions of this pane, starting at the top, as follows:

- **Toolbar** – The toolbar contains icons you will use regularly to generate the types of charts and information you want. The toolbar contains the following button options, which are shown from left to right in Figure 18-2. They are as follows:
  - New Counter Set
  - Clear Display
  - View Current Activity
  - View Log Data
  - View Graph
  - View Histogram
  - View Report
  - Add

- Delete
- Highlight
- Copy Properties
- Paste Counter List
- Properties
- Freeze Display
- Update Data
- Help

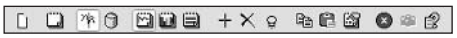

Figure 18-2: Performance toolbar.

- **Information Area** – The information area contains the qraph, histogram, or report that you want to view, as shown in Figure 18-3. Just click the desired button on the toolbar to view counter information in the desired format.

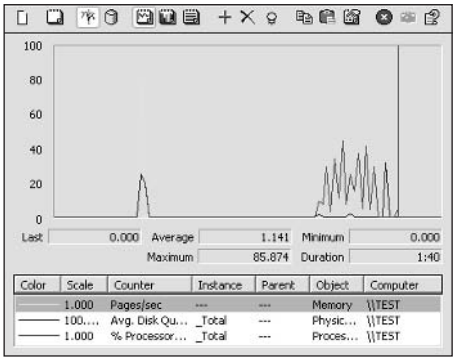

Figure 18-3: Information area.

- **Counter List** – The bottom portion of the window contains a counter list, as shown in Figure 18-4. All of the counters displayed in the list are currently being reported in the information area. You can easily remove or add counters to the list using the toolbar. Each counter in the counter list is given a different color for graphing and histogram purposes.

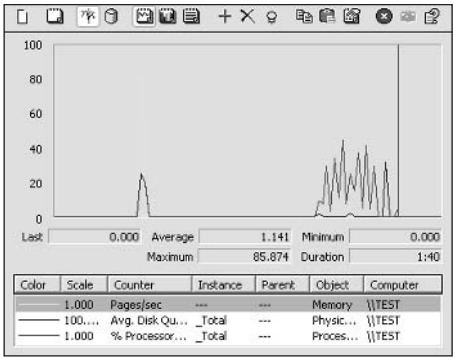

Figure 18-4: Counter list.

Adding Counters

You primarily use Performance by accessing objects and choosing counters. Choose the counters that you want to monitor, and then view those counters in either a chart, histogram, or report format. The following steps show you how to add counters to the Performance tool interface.

1. Click Start → Control Panel → Administrative Tools → Performance.
2. In the Performance MMC, click the New Counter Set button on the toolbar. Then click the Add button on the toolbar.
3. In the Add Counters window, shown in Figure 18-5, use the drop-down menu to choose a performance object. (As you can see, I have chosen the PhysicalDisk counter.)

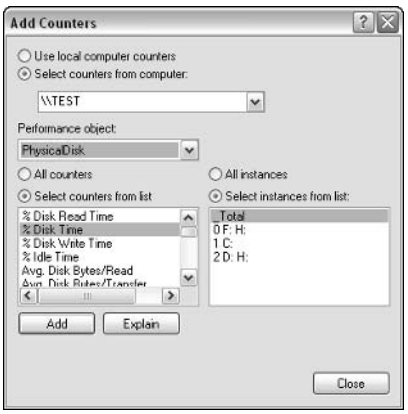

Figure 18-5: Add Counters.

4. Next, you can choose to monitor all counters under the object you selected, or you can choose specific counters. To select individual counters, simply select the counter and click the Add button. Notice that the Instances of the dialog box may be active, depending on your selection. The Instances dialog box allows you to choose certain instances, if they are available. For example, as you can see in Figure 18-5, I have three physical disks on the computer. I can monitor all disks or a selected one if I choose.
5. Repeat the counter add process until you have added all desired counters, then click Close.
6. You can see that the counters you added are being monitored. You can change the graph-histogram-report view by clicking a different option button on the toolbar. Figure 18-6 demonstrates the report view.

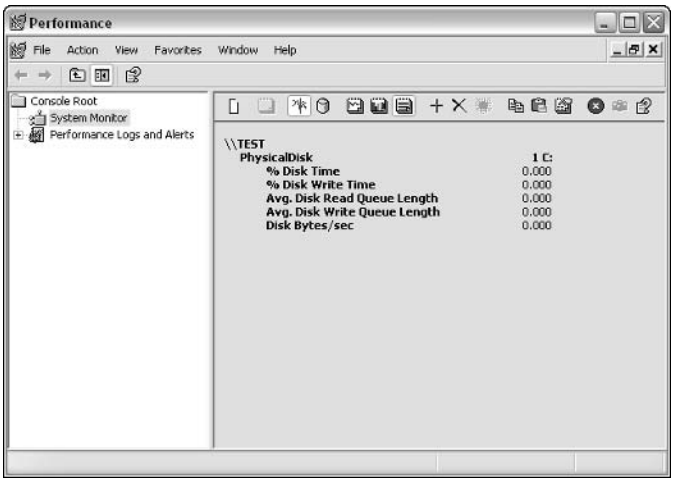

Figure 18-6: Report view.

Logging Data

As you monitor various counters, you can gain information about the performance of the system processes and components that you selected. Generally, consistent high readings mean that the component or hardware is not able to meet the burden placed on it by the operating system's processes. Although high spikes are normal, consistent high readings on counters usually mean that a problem exists. This is where your baseline data is important. Using the baseline, you can tell if a component has higher readings than normal and what those readings might mean for system performance.

So, if baseline performance is important to establish, how can you gain that data without sitting in front of a screen all day? Or, if a particular object seems to be causing problems, how can you monitor that object during an entire day's operations without physically watching the screen? The Performance tool gives you the ability to log data over a period of time, which is a great way to gain performance data without physically sitting at the machine. The performance data for the desired object(s) and counter(s) can be sampled over a period of time, and then recorded in a log file. You can then use the log file to examine the data at a time that is convenient for you. Fortunately, using the log file is rather easy; the following exercise walks you through the process:

1. In the Performance tool, expand Performance Logs and Alerts in the left pane. Right-click Counter Logs and click New Log Settings.
2. In the New Log Settings dialog box that appears, give the log file a name and click OK.
3. The settings window for the log appears. On the General tab, shown in Figure 18-7, you can change the default log filename and storage location if you like. Next, use the Add Objects and Add Counters buttons to add the desired objects or counters that you want to log. Under the sample data heading, choose how often you want the log file to sample data. For example, Figure 18-7 shows that I am sampling memory data every 15 seconds.

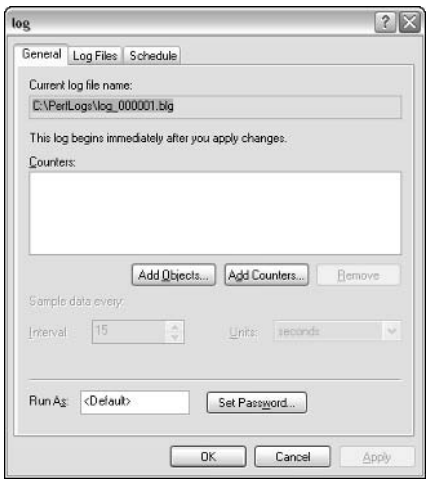

Figure 18-7: General tab.

4. On the Log Files tab, shown in Figure 18-8, you can choose the type of log file that you want to produce, which is a binary file by default. You can use the drop-down menu, however, to configure a text file, binary circular file, or even an SQL database file. You can use the rest of the tab to adjust the file-naming scheme.

Figure 18-8: Log Files tab.

5. The Schedule tab allows you to configure how the log file is started or stopped, as shown in Figure 18-9. The settings here are self-explanatory. When you are finished with all of the settings for the log file, just click OK.

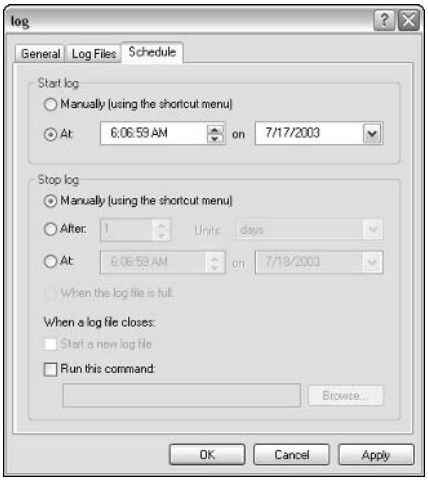

Figure 18-9: Schedule tab.

Creating Alerts

Say that you are using a Windows XP Professional computer for certain network tasks. To make sure that the computer is functioning at its peak, you want to be notified when a certain performance object falls below the performance baseline. The Performance tool can provide you with this information through an alert. An alert is simply an action that the Performance tool carries out when triggered. The trigger occurs when an object or counter falls below its specified performance baseline. You configure the alert to carry out a particular action, such as send a network message or record an event to the Event Log, when the alert is triggered. This is a great way to keep track of objects that fall below baseline standards, and in critical scenarios, it is a great way to find out about the baseline failures as they occur. As with log files, alerts are rather easy to configure; the following exercise shows you how:

1. In the Performance tool, expand Performance Logs and Alerts in the left pane. Right-click Alerts, and click New Alert Settings.
2. Give the new alert setting a name in the dialog box that appears and click OK.
3. On the General tab that appears, shown in Figure 18-10, add counters to the alert, just as you do for a log file. After you've added the counters to the list, choose a baseline limit and a data sample rate.

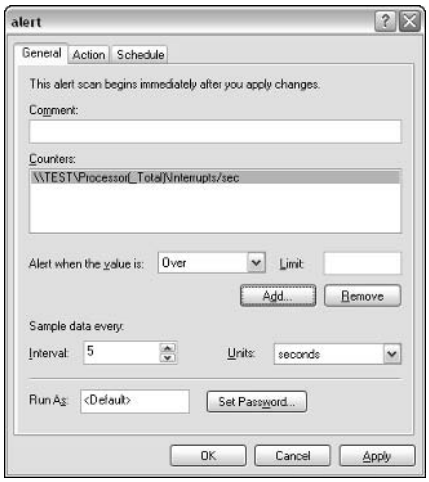

Figure 18-10: General tab.

4. On the Action tab, shown in Figure 18-11, choose an action that occurs when the event is triggered.
5. On the Schedule tab, you can configure a schedule as desired. This is the same Schedule tab you see when configuring a log file.

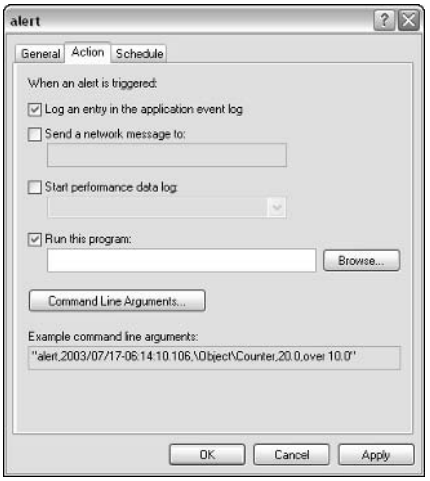

Figure 18-11: Action tab.

Using Task Manager's Performance Option

The Performance tool is very effective because you can identify and monitor specific counters. However, it can be a lot of work to monitor those counters and sift through the data they provide. What if your computer is running sluggishly or experiencing another common performance problem and you want a quick look at what's going on? No problem. Windows XP's Task Manager also provides a quick chart of common performance data. Just press CTRL+ALT+DEL to access Task Manager, and then click the Performance tab, shown in Figure 18-12. You can get a look at CPU usage and Page File usage, along with some other information about memory. The Performance tab tells you whether the CPU is the problem or memory is the problem. You don't have any configuration options here, but this feature is a great way to get quick performance information.

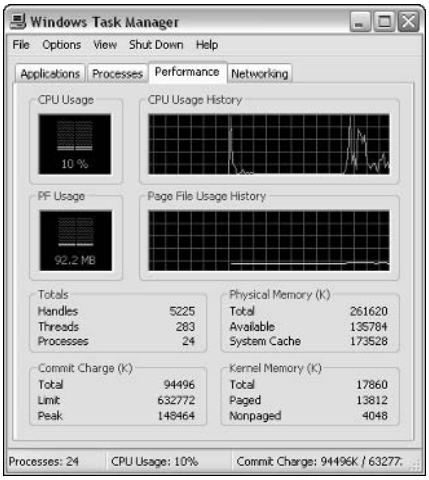

Figure 18-12: Performance tab.

Managing Hard Disk Performance

Hard disk performance generally isn't a serious problem because Windows XP gives you some helpful tools to keep the computer's hard disk(s) in tiptop shape. If you are having serious problems with a hard disk's performance, you can use the Performance tool to thoroughly examine the function of the hard disk. For physical disk performance, you'll find a PhysicalDisk object and a number of potential counters. For example, you can monitor %Disk Read Time, %Disk Write Time, %Idle Time, and so forth. In most cases, though, you'll not need to use the Performance tool to manage the performance of your hard disks. Doing so requires that you simply run a few tools from time to time to keep things in good working order and hard disk clutter out of the way.

Keep in mind that Windows XP gives you some basic hard disk management tools, but if you are serious about hard disk management, you'll also find a number of third-party products, such as Norton Utilities, that give you more flexibility and functions for managing hard disks. You might consider investing in one of these inexpensive programs, available at all computer stores.

Error Checking

The Error Checking tool, which is available on the Tools tab of the hard disk's properties sheets, gives you simple check box options to check for file system errors and recovery of bad sectors, as you can see in Figure 18-13. The Error Checking tool

needs complete access to the disk for it to work. Applications must be closed, and in some cases, Error Checking will ask you to reboot before it starts to gain complete access to the disk. If you use your computer frequently, it is a good idea to run this tool every 6 weeks or so just to make sure your disk is in good working order.

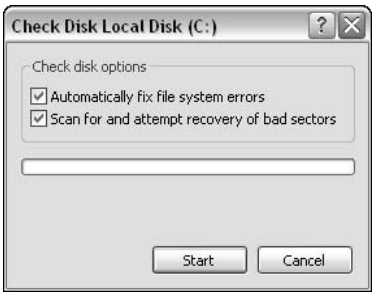

Figure 18-13: Error Checking.

Disk Defragmenter

Disk Defragmenter, which is also available on the Tools tab of the disk's properties sheets, is a tool you should run about once a month if you use your computer frequently. Disk Defragmenter helps repair file fragmentation, which occurs over time in any file system. Windows XP attempts to store files in a contiguous format. However, as files are changed and resaved, the file system has to move data to different blocks of free space. The end result is that a typical file might have pieces scattered all over the disk. When you open the file, the disk must work harder to retrieve all of the pieces and assemble them. When this happens, the disk is referred to as a fragmented disk.

The Disk Defragmenter tool is used to defragment the drive and rearrange data so that it is stored in a contiguous manner. Bear in mind that the defrag tool is not perfect, and the drive will not be completely defragmented after the utility is run. However, for very fragmented drives, you are likely to notice a performance improvement after running Disk Defragmenter. The following steps show you how to use the Disk Defragmenter tool.

1. Open My Computer. Right-click the disk that you want to defragment and click Properties. On the Tools tab, click the Defragment Now button.
2. The Disk Defragmenter window appears, as shown in Figure 18-14. Click the Analyze button.
3. An analysis of the drive is performed, and a message appears telling you whether or not you should defragment the drive. You can also choose to view a report, as shown in Figure 18-15.

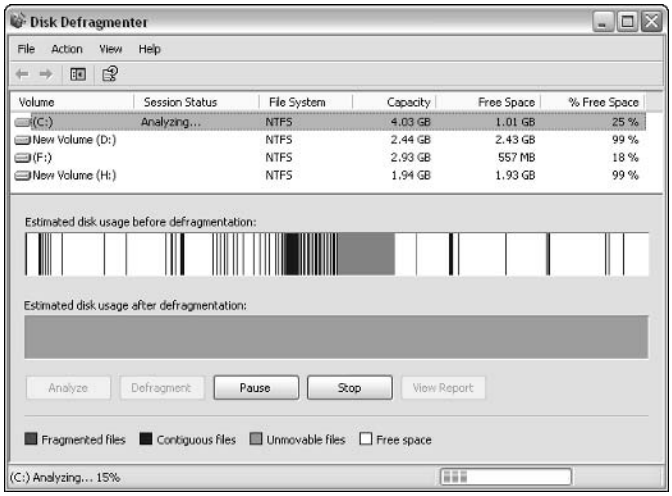
Disk Defragmenter
File Action View Help
Volume Session Status File System Capacity Free Space % Free Space
(C:) Analyzing... NTFS 4.03 GB 1.01 GB 25 %
New Volume (D:) NTFS 2.44 GB 2.43 GB 99 %
(F:) NTFS 2.93 GB 557 MB 18 %
New Volume (H:) NTFS 1.94 GB 1.93 GB 99 %
Estimated disk usage before defragmentation:
Estimated disk usage after defragmentation:
Analyze Defragment Pause Stop View Report
Fragmented files Contiguous files Unmovable files Free space
(C:) Analyzing... 15%

Figure 18-14: Disk Defragmenter analysis.

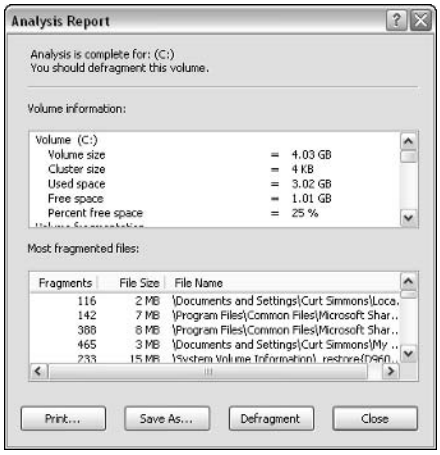
Analysis Report
Analysis is complete for: (C:)
You should defragment this volume.
Volume information:
Volume (C:)
Volume size = 4.03 GB
Cluster size = 4 KB
Used space = 3.02 GB
Free space = 1.01 GB
Percent free space = 25 %
Most fragmented files:
Fragments File Size File Name
116 2 MB \Documents and Settings\Curt Simmons\Loca..
142 7 MB \Program Files\Common Files\Microsoft Shar..
388 8 MB \Program Files\Common Files\Microsoft Shar..
465 3 MB \Documents and Settings\Curt Simmons\My ..
Print... Save As... Defragment Close

Figure 18-15: Analysis report.

4. If the drive needs to be defragmented, click the Defragment button. The defragmentation process begins and may take some time, depending on how badly the drive is fragmented. Once the process is complete, you can view a report again if you like.

Disk Cleanup

Windows XP also has a Disk Cleanup tool, which basically examines your hard disk for temporary files and other file fragments that are no longer needed. You can access Disk Cleanup on the General tab of the disk's properties pages. Click the Disk

Cleanup button, and Windows XP will examine your drive and tell you about the files it can safely remove and how much space you can gain, as shown in Figure 18-16. You can also click the More Options tab to clean up Windows components, installed programs, and system restore. Overall, this is a helpful tool that can give you a quick and automated way to remove hard disk junk that you don't need.

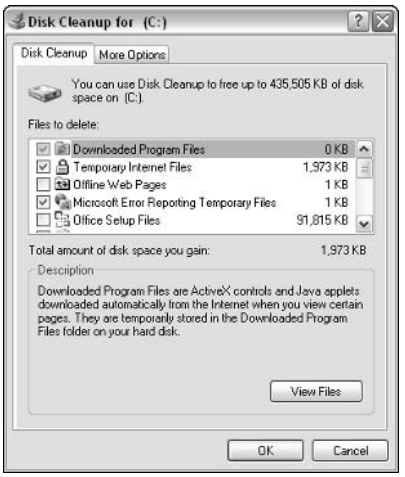
Disk Cleanup for (C:)
Disk Cleanup
More Options
You can use Disk Cleanup to free up to 435,505 KB of disk space on (C:).
Files to delete:
Downloaded Program Files 0 KB
Temporary Internet Files 1,973 KB
Offline Web Pages 1 KB
Microsoft Error Reporting Temporary Files 1 KB
Office Setup Files 91,815 KB
Total amount of disk space you gain: 1,973 KB
Description
Downloaded Program Files are ActiveX controls and Java applets downloaded automatically from the Internet when you view certain pages. They are temporarily stored in the Downloaded Program Files folder on your hard disk.
View Files
OK
Cancel

Figure 18-16: Disk Cleanup.

Managing Memory Performance

When discussing system performance, one of the most important issues that comes to mind is RAM, and rightfully so. Operating systems, as well as applications, are RAM guzzlers these days, and with the increase in digital photography and video applications, many people have problems getting enough RAM. The same is true for the processor – it must be able to keep up with the demands of the operating system and the applications and/or processes placed on it. Although memory and processor performance are not the only performance issues that you may face with Windows XP, they are certainly important.

As a part of desktop performance and configuration, Windows XP gives you a simple interface that allows you to adjust the graphical nature of Windows XP to conserve RAM and processor cycles. If a system seems sluggish, this may be your first line of defense. If you right-click My Computer and click Properties, or just open System in the Control Panel, you can click the Advanced tab, and then click the Settings button under Performance.

This opens the Performance Options window, as shown in Figure 18-17. As you can see on the Visual Effects tab, Windows XP attempts to choose its own settings by default. However, you can change these settings to adjust Windows XP's visual effects for appearance or performance. You can also click the Custom button and

clear the desired visual effects check boxes to reduce RAM and processor usage on certain items. For example, you might remove the shadows features and fading features of Windows XP.

Performance Options
Visual Effects
Advanced
Select the settings you want to use for the appearance and performance of Windows on this computer.
Let Windows choose what's best for my computer
Adjust for best appearance
Adjust for best performance
Custom:
Animate windows when minimizing and maximizing
Fade or slide menus into view
Fade or slide ToolTips into view
Fade out menu items after clicking
Show shadows under menus
Show shadows under mouse pointer
Show translucent selection rectangle
Show window contents while dragging
Slide open combo boxes
Slide taskbar buttons
Smooth edges of screen fonts
OK
Cancel
Apply

Figure 18-17: Visual Effects tab.

If you click the Advanced tab, you can also manage a few additional memory and processor settings, as shown in Figure 18-18. Windows XP is set to provide a greater amount of processor cycles to applications over Windows XP background processes. As a general rule, you should keep this setting to ensure that performance is optimized for applications, but you can change it so that the processor is used more efficiently for background services by simply clicking the radio button.

Next, you see that memory usage is also set to programs. This allows programs to get the most power from memory instead of system cache processes. However, depending on your RAM needs, you can optimize memory for system cache.

You also see the Page File (Virtual memory) Change button. If you click the Change button, you see the Virtual Memory window, shown in Figure 18-19. Virtual memory allows Windows XP to use a portion of the computer's hard disk as a memory storage area. As data is loaded into memory and memory becomes low, pages of data are written to the hard disk and recalled as they are needed. This feature allows Windows XP to keep more information readily accessible in memory, even when physical memory begins to run low. This virtual memory tactic is certainly nothing new in Windows (it was around even in the days of Windows 95), and the process still works the same in Windows XP.

Windows XP is set to manage its own virtual memory settings. However, you can manually input a minimum and maximum size for the page file if you like. The commonly recommended amount is 1.5 times the amount of physical RAM installed on the computer. So, if you have 128 MB of RAM, the recommended

initial paging file size is 192 MB. It is important to note here, however, that Windows XP does a good job of managing its own memory settings, and as a general guideline, you should allow Windows XP to handle those settings on its own. Incorrectly setting the virtual memory settings or choosing the No paging file option is likely to have adverse affects on system performance. Also, providing more paging file room is not a replacement for physical RAM. If the computer is running too slowly because there is not enough physical RAM installed on the system, the paging file will not provide a cheap solution. In short, the paging file is used to help Windows XP's physical memory – not replace it.

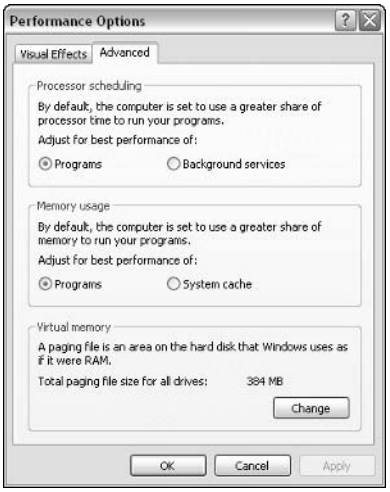
Performance Options
Visual Effects
Advanced
Processor scheduling
By default, the computer is set to use a greater share of processor time to run your programs.
Adjust for best performance of:
Programs
Background services
Memory usage
By default, the computer is set to use a greater share of memory to run your programs.
Adjust for best performance of:
Programs
System cache
Virtual memory
A paging file is an area on the hard disk that Windows uses as if it were RAM.
Total paging file size for all drives: 384 MB
Change
OK
Cancel
Apply

Figure 18-18: Advanced tab.

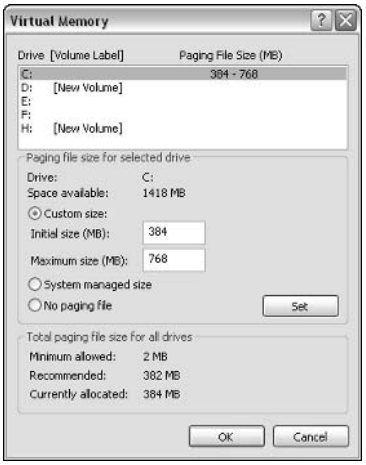

Figure 18-19: Virtual Memory.

Helpful Memory and Processor Performance Counters

Aside from the basic setting features previously mentioned, you can use the Performance tool to check out the performance of memory and the processor — and even the paging file. By monitoring these objects, you can get a clear view of system and application usage, and how memory and the processor are holding up under the demands placed on them. See the previous section on the Performance tool, and consider using these important counters.

For the processor object, use these common counters:

- **%Interrupt Time** — The amount of time the processor spends receiving and servicing hardware interrupts. This counter can help you see if the processor can handle the system's hardware needs.
- **%Processor Time** — The percentages of time the processor spends to execute a non-idle threat. This counter tells you how much time the processor requires to meet system and application threads.
- **Interrupts/sec** — The average rate at which the processor receives and services interrupts.
- **%Idle Time** — The amount of time that the processor is idle during a sampling period. If there seems to be no idle time, this may indicate that the processor cannot keep up with system, application, and hardware demands.

For the memory object, keep these counters in mind:

- **Page Reads/sec** — The amount of pages read in a monitored second.
- **Page Writes/sec** — The amount of pages written in a monitored second.
- **Pages/sec** — The rate at which pages are written to or read from a disk.

For the paging file object, keep these counters in mind (which are the only two):

- **%Usage** — The amount of page file instances in use.
- **%Usage Peak** — The peak usage of the paging file in a percentage. A high percentage is an indicator that more RAM may be needed on the system because the paging file is being used excessively.

Scheduling Tasks

Scheduled Task gives you a way to schedule certain tools and utilities to run at specific times so you can automate the process of keeping Windows XP functioning at its peak. Scheduled Task is rather straightforward and easy to configure with the

help of the Scheduled Task Wizard. The following steps walk you through the process. Consider using Scheduled Task to run Disk Defragmenter or Error Checking during the night so the tools don't interrupt your work. Also, make sure that the date and time on the computer's clock are accurate so that Scheduled Task will actually run when you want it to.

1. Click Start → All Programs → Accessories → System Tools → Scheduled Task.
2. In the Scheduled Task folder, double-click Scheduled Task Wizard.
3. Click Next on the Welcome screen.
4. In the Scheduled Task Wizard window, select the task that you want to schedule, as shown in Figure 18-20. You can also browse for other programs, if necessary. Click Next.

Figure 18-20: Select the desired task.

5. In the next window, give the task a name and choose when you want to run the program (daily, weekly, monthly, when you log on, and so on). Click Next.
6. Depending on your selection, an additional window may appear where you configure the time and day of the week, as shown in Figure 18-21. Make any necessary selections and click Next.
7. Your username is listed on the next screen. Enter your password, if required, for your account. Note that scheduled tasks are configured for a certain user — multiple users on the same computer can have different scheduled tasks configured. Click Next.
8. Review your settings and click Finish. If you want to see Advanced properties for the scheduled task, click the check box before clicking Finish.

Figure 18-21: Create a schedule.

9. If you choose to view Advanced properties, the properties pages for the task appear. The Task and Schedule tabs allow you to make changes to the values you configured when using the wizard. However, the Settings tab enables some additional configuration options, as follows:
   - Delete the task if it is not scheduled to run again.
   - Stop the task if it runs for *x* number of hours and *x* minutes. This is a safety feature that stops a task that is taking too long to complete.
   - You can choose to start the task only if the computer has been idle for *x* number of minutes, and you can stop the task if the computer ceases to be idle.
   - You can choose not to start the task if the computer is running on batteries, and to stop the task if the computer enters battery mode.

After you create a scheduled task, it appears in the Scheduled Task folder. You can right-click the task and run it manually if desired, delete it, or change the properties of the scheduled task. If you are having problems with scheduled tasks, or if you want to suspend all scheduled tasks, you can easily do so in the Scheduled Task folder. Notice the Advanced menu. This menu contains the options to stop using Scheduled Task, pause Scheduled Task, enable a notify option of missed tasks, change the service account, and view a log file.

Your scheduled tasks run at the time they are configured to run, even if you are not logged on to the computer, and even if another user is logged on. In this case, the scheduled tasks still run, but are invisible to the user who is currently logged on.

Chapter 19

System Failure and Recovery

IN THIS CHAPTER

- Using CTRL+ALT+DEL
- Running Safe Mode
- Using System Restore
- Using the Recovery Console

NO MATTER HOW GREAT Windows XP may be, it is still an operating system running millions of lines of code, and problems can certainly occur. Fortunately, Windows XP is more stable than any other operating system Microsoft has produced to date. In most cases, problems you experience will be the result of applications that are not behaving the way they are supposed to, or hardware problems. Windows XP gives you a few tools that can help you solve problems and get out of jams.

Troubleshooting Windows XP

When a problem arises, don't get in a hurry. Think carefully about what has happened and what you were doing when the problem occurred. Consider grabbing a piece of scratch paper and writing down the steps you have taken and which applications were open when the problem occurred. If there are serious problems with Windows XP, you might need this information later. Next, use a logical approach to problem solving. Try one thing at a time to resolve the problem. With each action you take, write down what you did. Do not randomly press keys – do one thing at a time in an organized manner. Remember, computer operating systems are built on logic. Use logic when you try to solve problems. The following sections explore some problem-solving tools and tactics that are at your disposal.

Using CTRL+ALT+DEL

Although you will not experience the system lockup problems that you did in previous versions of Windows, you might have an application that stops responding from time to time. In Windows 9*x,* this would often bring your entire system to a standstill, but that is typically not the case in Windows XP. A system lockup occurs when an application doesn't behave the way it should. Basically, when an application locks up, the application stops responding to mouse and keyboard controls. In some cases, two applications that are open can interfere with each other, causing them both to lock up. Fortunately, Windows XP itself is unlikely to lock up. In most cases, you can still get control of the system and close the offending application without having to reboot Windows.

In the case of an application lockup, you should use the CTRL+ALT+DEL command on your keyboard. This action opens the Windows Task Manager. Click the Applications tab, shown in Figure 19-1, and you can see any applications that are currently open. If an application is not working, its status will say Not Responding. You can select the name of the program and click End Task on the Applications tab. This action forces the task to end so you can get control of your computer. If you have any unsaved data in your application at the time it locked up, you will lose that data (save data frequently when working to avoid loss).

Figure 19-1: Use Windows Task Manager to close applications.

In some cases, CTRL+ALT+DEL will not give you control of the computer. This problem occurs when there are errors within Windows XP, possibly associated with an application, that cause the operating system to hard lock. In this situation, pressing CTRL+ALT+DEL doesn't do anything. You can't do anything by pressing keys on your keyboard, and your mouse pointer is gone. In such cases, the only way to get control of Windows XP is to turn off the computer's power switch. Again, a complete hard lock is uncommon in Windows XP, but it is possible.

Accessing Windows Help

Windows XP provides excellent troubleshooting information via the Help files. In the past, Windows Help files have been somewhat sketchy. They are still not perfect in Windows XP, but you are likely to find information that can be of help when you are trying to solve problems. With an Internet connection, the Help files can search the local file database for information and access information at Microsoft.com. The Help files are self-explanatory for the most part, but I do want to mention some standard interfaces and available options you should take note of. You can easily access Windows Help by clicking Start, and then clicking Help and Support. The Windows Help interface appears, as shown in Figure 19-2.

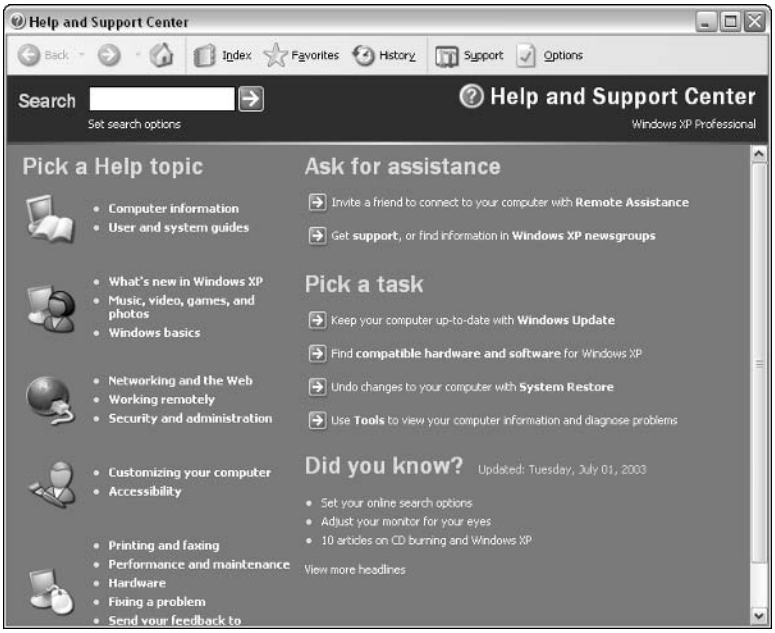

Figure 19-2: Home section of Windows Help and Support Center.

Notice the "Did you know?" section on the initial start page. This information comes directly from the Internet and can be a great source of articles and information. You can even set your own online search options here.

When you first open the Help files, you find yourself in the Home section (shown in Figure 19-2). Home is the starting point of accessing Help. Home is used to mimic a Web page because the Windows Help files are HTML-based, just like a Web page. As you use Help, you'll notice hyperlinks that enable you to jump from the Help files to additional help resources on the Internet.

In the Home window, you'll see some generic categories that can help you get moving in the right direction, such as Networking, Games, Sound, Video, and so on. You also see sections where you can fix a problem or find more resources.

If you click the Index icon on the Help toolbar, you can access the Help Index, shown in Figure 19-3.

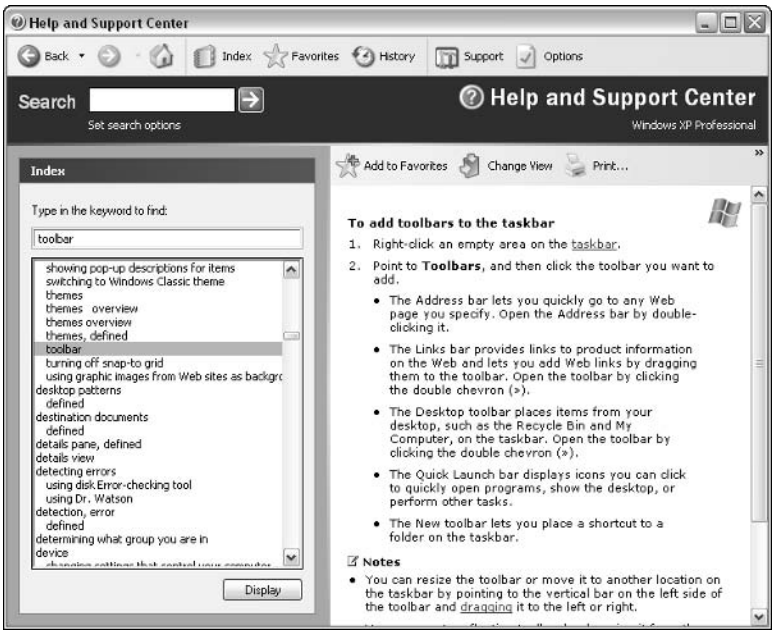
Help and Support Center
Back
Index
Favorites
History
Support
Options
Search
Set search options
Help and Support Center
Windows XP Professional
Index
Type in the keyword to find:
toolbar
showing pop-up descriptions for items
switching to Windows Classic theme
themes
themes overview
themes overview
themes, defined
toolbar
turning off snap-to grid
using graphic images from Web sites as backgr
desktop patterns
defined
destination documents
defined
details pane, defined
details view
detecting errors
using disk Error-checking tool
using Dr. Watson
detection, error
defined
determining what group you are in
device
Display
Add to Favorites
Change View
Print...
To add toolbars to the taskbar
1. Right-click an empty area on the taskbar.
2. Point to Toolbars, and then click the toolbar you want to add.
The Address bar lets you quickly go to any Web page you specify. Open the Address bar by double-clicking it.
The Links bar provides links to product information on the Web and lets you add Web links by dragging them to the toolbar. Open the toolbar by clicking the double chevron (»).
The Desktop toolbar places items from your desktop, such as the Recycle Bin and My Computer, on the taskbar. Open the toolbar by clicking the double chevron (»).
The Quick Launch bar displays icons you can click to quickly open programs, show the desktop, or perform other tasks.
The New toolbar lets you place a shortcut to a folder on the taskbar.
Notes
You can resize the toolbar or move it to another location on the taskbar by pointing to the vertical bar on the left side of the toolbar and dragging it to the left or right.

Figure 19-3: Help Index.

On the left side of the window, you see the entire index displayed in alphabetical order. Use the scroll bar to locate a topic you want, select it, and then click the Display button. The information about that topic appears in the right pane. You can read the information, click the Print button to print a copy, and even reorganize the window by clicking the Change View button. If you don't want to scroll down the list of index topics, you can type a keyword in the Search dialog box above the index. The closest matches to your search request will appear.

As you are searching, keep these actions in mind: Searches are not case-sensitive and you can use operator words, such as and, or, not, and so forth. Also, you'll often have better results if you use your primary keyword first in the search string.

The Add to Favorites option, also available on the toolbar, works a lot like Favorites in Internet Explorer. Whenever you find a Help page that you want to visit again, click the Add to Favorites button and the page will be added to a Favorites list. Whenever you want to see that list, click the Favorites menu option

at the top of the window to see a list of your favorite Help topics. Also, just like Internet Explorer, History keeps track of all of the pages you have visited on the Internet from the Help and Support interface. You can check out the History and revisit any of these pages by double-clicking the link that appears in the list. The Options section allows you to change the interface of Help and Support and even share Help with others.

One of the best features of the Help and Support Center is the Support option, (see Figure 19-4) also found on your toolbar. If you are having serious problems with Windows XP that you can't seem to resolve, you can get help from one of two places: by asking a friend or from the Windows Web site forum.

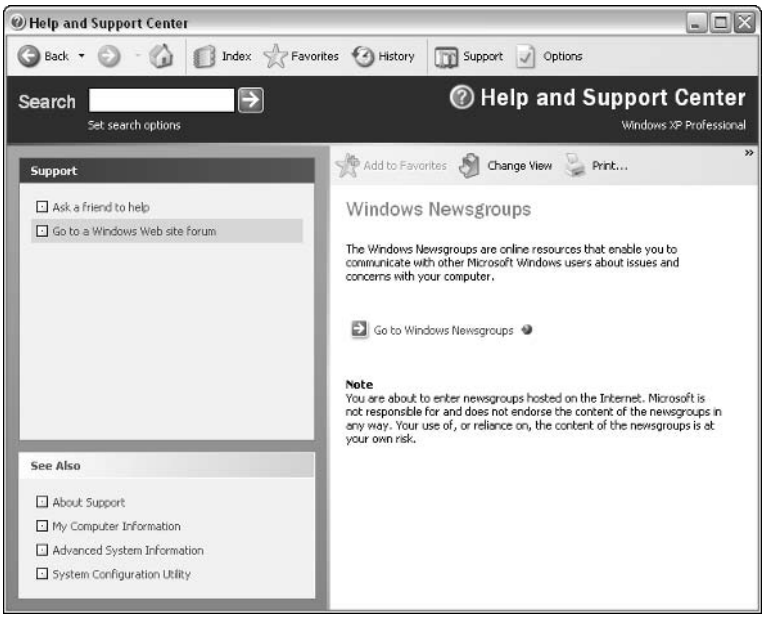
Help and Support Center
Back
Index
Favorites
History
Support
Options
Search
Set search options
Help and Support Center
Windows XP Professional
Support
Ask a friend to help
Go to a Windows Web site forum
See Also
About Support
My Computer Information
Advanced System Information
System Configuration Utility
Add to Favorites
Change View
Print...
Windows Newsgroups
The Windows Newsgroups are online resources that enable you to communicate with other Microsoft Windows users about issues and concerns with your computer.
Go to Windows Newsgroups
Note
You are about to enter newsgroups hosted on the Internet. Microsoft is not responsible for and does not endorse the content of the newsgroups in any way. Your use of, or reliance on, the content of the newsgroups is at your own risk.

Figure 19-4: Support options.

If you click the Ask a friend to help option, you can create a Remote Assistance file that you can send to a friend so he or she can help you with your problem. The Support window gives you easy, step-by-step instructions to generate this remote Help connection. For more information about this feature, refer back to Chapter 13.

The second option is to Go to a Windows Web site forum. This feature allows you to access online newsgroups and resources so you can try to find the answer to your problem. The content, though, comes from other users, so you'll sometimes find mistakes. Still, this feature can be really helpful. You'll need an active Internet connection to use this feature.

Windows Troubleshooters

Within the Windows Help interface, you can access a handy, helpful component called a *troubleshooter*. A troubleshooter is an HTML interface that appears on the Help window. The troubleshooter asks you a series of questions and tells you to try different actions to resolve a problem you are having. Many troubleshooters are available in the Help files, and they are easy to use. Just follow these steps:

1. Click Start → Help and Support.
2. In the Help Search window, type the kind of troubleshooter you want. For example, you might type **modem troubleshooter**, **ICS troubleshooter**, or **sound card troubleshooter**, and so forth. To see a full list, just type **troubleshooter**.
3. Begin the troubleshooter by clicking an appropriate link that comes back from your search, and then click the Next button to continue.
4. Continue following the troubleshooter steps to attempt to solve the problem you are experiencing.

Using Safe Mode

Safe Mode is a Windows XP feature that enables you to start Windows with a minimal number of drivers. Safe Mode is used in instances when you cannot start Windows normally. Safe Mode fixes problems with your system – it essentially gets Windows up and running, but that's about it. Most major XP features do not work in Safe Mode.

Several different Safe Mode options are available to you so that you can boot Windows, according to your specific needs. They are as follows:

- **Safe Mode** – If Windows XP will not start normally, you can use this basic Safe Mode option, which attempts to load Windows XP with a minimal number of drivers. Once you reach the desktop, you can troubleshoot the problem and use System Restore (see the next section), if necessary.
- **Safe Mode with Networking** – This option boots into Safe Mode, but it enables networking services and protocols so you an access network resources within Safe Mode.
- **Safe Mode with Command Prompt** – This option boots into Safe Mode and enables you to use the command prompt for command line troubleshooting.

- **Enable Boot Logging** – This option logs the entire boot process. This feature can be helpful to support technicians or related personnel who can analyze the boot process and see where the boot process is failing.
- **Enable VGA Mode** – This option boots Windows XP with a generic video graphic array (VGA) driver for your display adapter. Wrong display adapter drivers are common problems with boot failure.
- **Last Known Good Configuration** – This option uses the last known good backup of the CurrentControlSet in the Registry to boot Windows. Each time you successfully boot Windows, the CurrentControlSet key is backed up. The Last Known Good option allows you to boot using that saved Registry key.

You can access all of these options by using the Windows Startup menu, which you'll see if you hold down the CTRL key on your keyboard when you turn on your computer. If CTRL doesn't seem to work, hold the F8 key down when you start the computer. You'll see a Startup menu that allows you to choose Safe Mode, Safe Mode with Networking, and some other options. When your computer boots into Safe Mode, you can access the tools and help you need to try to solve the problem. When you've finished, just reboot the computer and it will boot into Normal Mode.

Using System Restore

I can emphatically say that System Restore is a great feature of Windows XP and one that can get you out of all sorts of trouble. What if your computer won't start? What if you install a bad application that wrecks your computer? What if your nephew decides to delete C:\Windows? No problem – just use System Restore and put your computer back to the way it was before the problem, tragedy, or accident happened, with only a few mouse clicks. I've used System Restore numerous times after fouling up Windows XP with my experiments, and I must say, it has worked flawlessly for me. The following sections show you how to use System Restore.

Enabling System Restore

System Restore is automatically installed and configured on Windows XP if your computer has at least 200 MB of free disk space after Windows XP is installed. If your computer does not have 200 MB of free disk space, System Restore is installed, but it is not set up to run. System Restore functions by saving information about your system so that it can be restored in the event of a problem. For System Restore to function correctly, 200 MB of free disk space is required, and, in reality, System Restore may need much more. Fortunately, if you are using a newer computer, you most likely have plenty of free disk space, and System Restore is already operational on your computer.

If your computer did not have 200 MB of free disk space upon initial installation, but you have made 200 MB or more of free disk space available, you can enable System Restore so that it begins functioning on your Windows XP computer. To enable System Restore, just follow these steps:

1. In the Control Panel, double-click System, right-click My Computer, and then click Properties.
2. Click the System Restore tab.
3. You can click the check box shown in Figure 19-5 to turn off System Restore on all drives on your computer. If this check box is selected, just click to clear it so that System Restore is enabled.

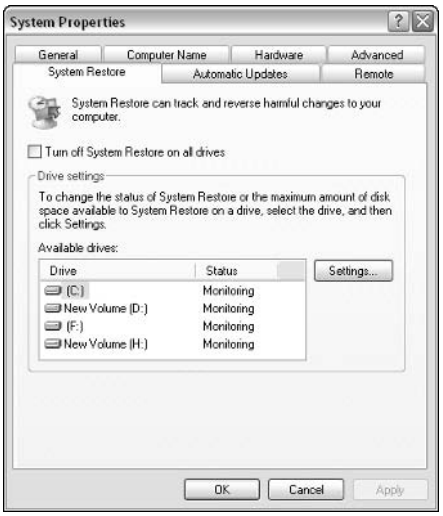

Figure 19-5: System Restore tab.

4. Click OK, and OK again in the System Properties window.

By default, System Restore is given 12 percent of your hard disk space when you install Windows XP, assuming that 12 percent is at least 200 MB. If you access System Properties, click the System Restore tab, and then click the Settings button, you see a slider bar on the Drive Settings dialog box that indicates the total amount of disk space System Restore is allowed to use, as shown in Figure 19-6. You can raise or lower this amount by moving the slider bar. However, keep in mind that System Restore must have at least 200 MB, and if you want System Restore to function really well, you should leave this 12 percent setting at its default level.

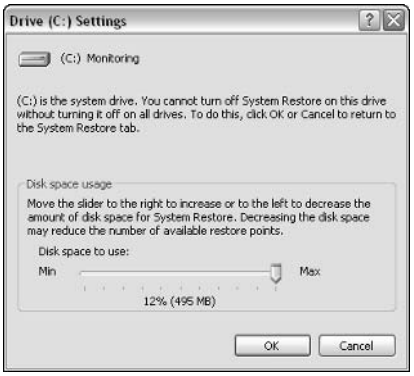
Drive (C:) Settings
(C:) Monitoring
(C:) is the system drive. You cannot turn off System Restore on this drive without turning it off on all drives. To do this, click OK or Cancel to return to the System Restore tab.
Disk space usage
Move the slider to the right to increase or to the left to decrease the amount of disk space for System Restore. Decreasing the disk space may reduce the number of available restore points.
Disk space to use:
Min
Max
12% (495 MB)
OK
Cancel

Figure 19-6: Drive Settings.

Creating Restore Points

System Restore functions by creating restore points. A *restore point* is a snapshot of your computer's configuration that is stored on your hard disk. If System Restore needs to be used, System Restore accesses a restore point to reconfigure your computer. This process brings your computer back to a stable state — a place where it was when the system was stable. It is very important to note here that System Restore restores your operating system and applications only. It does not save and restore any files. If you delete a project you are working on, you can't use System Restore to get the project back. Also, note that System Restore doesn't protect you from any viruses, Trojan horses, or any other malicious code. Incidentally, System Restore does not affect other files, such as e-mail and Web pages. Performing a System Restore won't make you lose new e-mail or files — it only configures your system settings and application settings.

System Restore automatically creates restore points for you, so there is no need to manually create a restore point. However, if you are about to try some configuration option or configure some software that you know might be risky or that has caused you problems in the past, you can manually create a restore point so you can later restore your system to its present state. To create a restore point, just follow these easy steps:

1. Click Start → All Programs → Accessories → System Tools → System Restore.
2. In the System Restore window, click the Create a restore point button, and then click Next, as shown in Figure 19-7.
3. In the window that appears, enter a description. You might want to include information that will help you distinguish the restore point from others. The date and time of the restore point are added automatically so you don't need to include those. Click Next.
4. The restore point is created. Click OK and you're done.

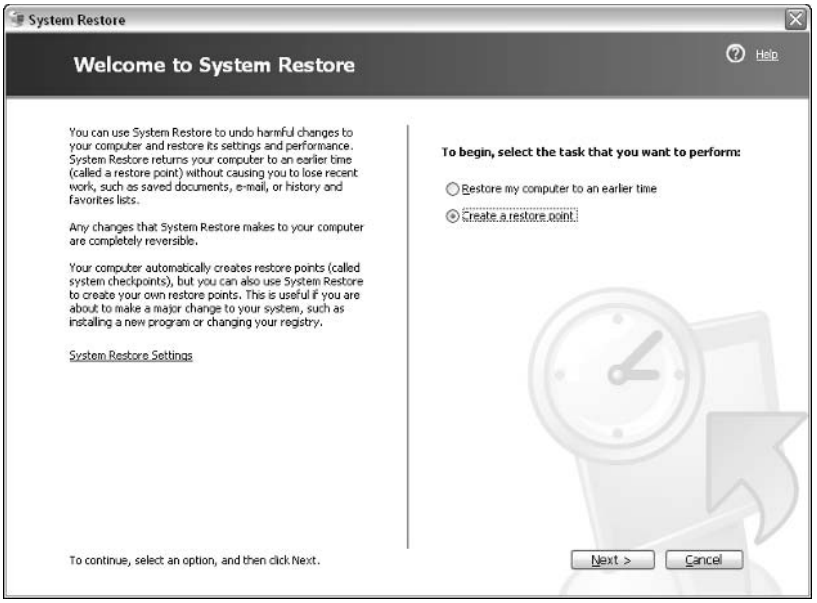
System Restore
Welcome to System Restore
Help
You can use System Restore to undo harmful changes to your computer and restore its settings and performance. System Restore returns your computer to an earlier time (called a restore point) without causing you to lose recent work, such as saved documents, e-mail, or history and favorites lists.
Any changes that System Restore makes to your computer are completely reversible.
Your computer automatically creates restore points (called system checkpoints), but you can also use System Restore to create your own restore points. This is useful if you are about to make a major change to your system, such as installing a new program or changing your registry.
System Restore Settings
To begin, select the task that you want to perform:
Restore my computer to an earlier time
Create a restore point
To continue, select an option, and then click Next.
Next >
Cancel

Figure 19-7: Create a restore point.

Using System Restore

In the event that you need System Restore, you'll certainly be glad that the software has been keeping track of your system and creating restore points. Running a System Restore is easy, and the following two sections show you how to use System Restore.

IF YOU CAN BOOT WINDOWS . . .

If you can boot Windows, follow these steps:

1. Click Start → All Programs → Accessories → System Tools → System Restore.
2. Click the Restore My Computer to an Earlier Time radio button, and then click Next.
3. A calendar and a selection list are presented to you, as shown in Figure 19-8. You can select different days to find a desired restore point. If you did not create a restore point, you should choose to use the latest one available. The latest one will be listed first in the current or previous day window. Select a restore point and click Next.
4. A message appears telling you to save all files and close all open applications. Do so at this time, and then click the Next button.
5. Restoration takes place on your computer, and your computer automatically reboots when the restoration is complete. Click OK on the restoration message that appears after you reboot.

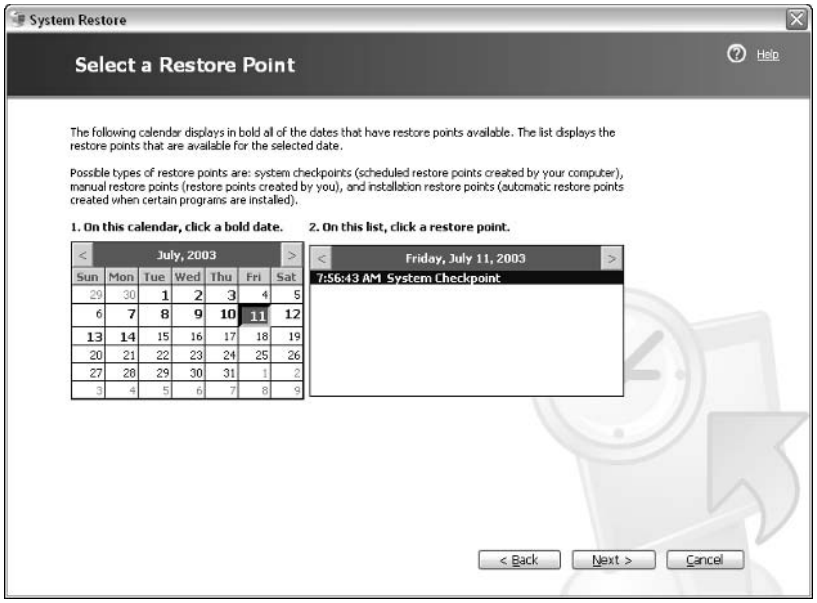
System Restore
Select a Restore Point
Help
The following calendar displays in bold all of the dates that have restore points available. The list displays the restore points that are available for the selected date.
Possible types of restore points are: system checkpoints (scheduled restore points created by your computer), manual restore points (restore points created by you), and installation restore points (automatic restore points created when certain programs are installed).
1. On this calendar, click a bold date.
2. On this list, click a restore point.
July, 2003
Sun Mon Tue Wed Thu Fri Sat
29 30 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31 1 2
3 4 5 6 7 8 9
Friday, July 11, 2003
7:56:43 AM System Checkpoint
< Back
Next >
Cancel

Figure 19-8: Choose a restore point.

IF YOU CANNOT BOOT WINDOWS . . .

If you cannot boot Windows, follow these steps to run System Restore:

1. Turn on your computer and hold down the CTRL key or the F8 key until you see the Startup menu options.
2. Choose Safe Mode, and then press the Enter button.
3. After Windows boots, the Help screen that appears gives you the option to restore your computer. Click the System Restore link.
4. Click the Restore My Computer to an Earlier Time radio button and then click Next.
5. A calendar and a selection list are presented to you. You can select different days to find a desired restore point. If you did not create a restore point, you should choose the latest one available. The latest one will be listed first in the current or previous day window. Select a restore point and click Next.
6. A message appears telling you to save all files and close all open applications. Do so at this time, and then click the Next button.
7. Your computer automatically reboots when the restoration is complete. Click OK on the restoration message that appears after booting has taken place.

Undoing a Restoration

In the event that a System Restore doesn't give you the results you need, or you happen to select the wrong restore point, you can reverse a restoration. The following sections show you how to reverse a restoration.

REVERSING A RESTORATION IF YOU CAN BOOT WINDOWS

To reverse a restoration if you can boot your computer, follow these steps:

1. Click Start → All Programs → Accessories → System Tools → System Restore.
2. In the System Restore window, click the Undo my last restoration radio button, and then click Next. The Undo my last restoration option does not appear unless you have previously run a restoration.
3. Close any open files or applications, click OK, and then click Next.
4. The previous restoration is removed and your computer reboots. Click OK on the restoration message that appears after reboot.

REVERSING A RESTORATION IF YOU CANNOT BOOT WINDOWS

If you cannot boot into Windows and you need to undo a restoration, just follow these steps:

1. Turn on your computer and hold down the CTRL key or the F8 key until you see the Startup menu options.
2. Choose Safe Mode and then press the Enter button.
3. When Windows boots, the Help screen that appears gives you the option to restore your computer. Click the System Restore link.
4. Click the Undo my last restoration radio button, and then click Next.
5. A message appears telling you to save all files and close all open applications. Do so at this time, and then click the Next button.
6. Your computer is rebooted once the restoration has been removed.

Important System Restore Issues

When you are working with System Restore, you should keep a few issues in mind because they might affect the desired outcome of a system restore:

- Applications that you install in-between restore points will not be saved during a system restore. You'll need to reinstall those applications.
- Always remember that System Restore does not provide backup functions. If you lose data due to any problem, the data is lost unless you have a backup.

- If you create a new user account and then use System Restore to go back to a restore point before the new user account was created, the new user account will be lost. However, System Restore doesn't actually remove the user's data, just the account.
- If you change your computer or workgroup name between restore points and then perform a System Restore, your computer or workgroup name will be rolled back to the previous name.
- If you use the Recovery Console (see the next section) to make changes to your system, System Restore will not detect those changes, and they will not be recovered during a System Restore.
- When you install a service pack, you can choose to save or reset the restore points. If you use the reset option, all restore points are deleted. Then, System Restore will begin creating new restore points.
- If you stop monitoring a drive with System Restore, all of the restore points on the drive are deleted. In other words, you can't monitor a drive during certain periods only. Once you turn off System Restore, you lose all of the restore points on that drive.

Using the Recovery Console

The Recovery Console is a powerful tool in Windows XP that can enable you to start your computer and fix problems when your computer will not boot normally. I will, however, give you the warnings upfront. The Recovery Console is considered a power user or administrator tool and is not to be taken lightly. The Recovery Console gives you many command options, which you can use to fix your computer — or further wreck it, depending on your actions. The Recovery Console is a command line interface tool, so the changes you make occur immediately and without any additional warnings. As such, the Recovery Console is a helpful, but potentially dangerous tool. With the right commands and understanding, however, it can certainly get you out of Windows XP jams when Safe Mode, System Restore, and other standard troubleshooting options have failed.

Using the Recovery Console, you can do the following:

- Enable and disable services
- Format drives
- View directories
- Copy files from a floppy disk or CD and place them in directories

- Read and write data on a local drive
- Fix the boot sector

There are many administrative options you might find helpful to fix Windows if you can't start the operating system.

It is important to note that the Recovery Console isn't the command prompt (cmd.exe). You don't have the flexibility or the number of options that you find when using the command prompt because you would have a big security hole in your computer if you did. As such, you can only access files in the root directory of any volume: in the %SystemRoot% folder and subfolders; the Recovery Console folder and subfolders; and files and folders on removable disks, such as floppy disks and CDs. Additionally, write access to removable disks is enabled, which prevents someone from copying files from your system to a removable disk. Also, you cannot change the local Administrator password using the Recovery Console. Finally, you can't use any text-editing tools from within the Recovery Console.

One additional note concerns dynamic disks. If you are using dynamic disks on the installation you access via the Recovery Console, you might not see the dynamic volumes displayed accurately in the Recovery Console. This is simply a technical limitation, and you can read more about it at Microsoft.com by accessing the Knowledge Base article, Q227364.

Installing and Starting the Recovery Console

The Recovery Console is not available by default in Windows XP. You'll need to install it so that it appears as a boot menu option that you can select when you start Windows XP.

To install the Recovery Console as a startup option, follow these steps:

1. Log on with the local Administrator account.
2. With Windows running, insert the Setup CD into your CD-ROM drive.
3. Click Start → Run.
4. Type the following where *D*: is the CD-ROM drive letter:

   ```
   D:\i386\winnt32.exe /cmdcons
   ```

5. Follow the instructions on the screen.

To start the Recovery Console from the Windows XP Setup CD-ROM, follow these steps:

1. Insert the Setup compact disc (CD) and restart the computer. If prompted, select any options required to boot from the CD.
2. When the text-based part of Setup begins, follow the prompts; choose the repair or recover option by pressing **R**.

3. If you have a dual-boot or multiple-boot system, choose the installation that you need to access from the Recovery Console.
4. When prompted, type the Administrator password.
5. At the system prompt, type your Recovery Console commands. When you are using the Recovery Console, you can type **help** for a list of commands.
6. To exit the Recovery Console and restart the computer, type **exit**.

To start the Recovery Console if you have installed it as a startup option, follow these steps:

1. During startup, select Recovery Console from the Startup options menu.
2. If you have a dual-boot or multiple-boot system, choose the installation that you need to access from the Recovery Console.
3. When prompted, type the Administrator password.
4. At the system prompt, you can begin using the Recovery Console.
5. To exit the Recovery Console and restart the computer, type **exit**.

Recovery Console Commands

When you are ready to use the Recovery Console, you'll need to use the available Recovery Console commands to fix Windows XP. Several are available to you, and the following sections outline each command and its parameters.

ATTRIB

Attrib changes file attributes for a single file or folder. This command sets or removes the read-only, system, hidden, and compressed attributes assigned to files or directories. You can use the following parameters:

```
attrib [+r|-r] [+s|-s] [+h|-h] [+c|-c] [[drive:][path] filename]
```

- **+r** – Sets the read-only file attribute
- **-r** – Clears the read-only file attribute
- **+s** – Sets the system file attribute
- **-s** – Clears the system file attribute
- **+h** – Sets the hidden file attribute
- **-h** – Clears the hidden file attribute
- **+c** – Sets the compressed file attribute

- **-c** – Clears the compressed file attribute
- [[*drive*:][*path*] *filename*] – Specifies the location and name of the directory or file you want to process

BATCH

The **batch** command executes the commands specified in a text file. Use `batch input_file [output_file]` where *input_file* specifies the text file that contains the list of commands to be executed. *Input_file* can consist of a drive letter and a colon, a folder name, a filename, or a combination of these. *Output_file*, if specified, stores the output of the commands in the named file. If not specified, the output is displayed on the screen.

BOOTCFG

Use the **bootcfg** command for boot configuration and recovery (boot.ini for most computers). The **bootcfg** command with different parameters is available from the command prompt. Make sure you make a backup of your boot.ini file before running any of these commands. A few examples follow:

- **bootcfg /default** – Sets the default boot entry
- **bootcfg /add** – Adds a Windows installation to the boot list
- **bootcfg /rebuild** – Iterates through all Windows installations and allows the user to choose which parameters to add
- **bootcfg /scan** – Scans all disks for Windows installations and displays the results
- **bootcfg /list** – Lists the entries already in the boot list
- **bootcfg /disableredirect** – Disables redirection in the boot loader
- **bootcfg /redirect [PortBaudRate] | [useBiosSettings]** – Enables redirection in the boot loader with the specified configuration

CHDIR

The **chdir** command checks a directory; it displays the name of the current directory or changes the current folder. You have the following parameter options:

```
chdir [drive:][path] [..]   or  cd [drive:][path] [..]
```

- **none** – Used without parameters, **chdir** displays the names of the current drive and folder. Used with only a drive letter (for example, cd C:), **chdir** displays the current directory on the specified drive.
- **[drive:][path]** – Specifies the drive (if other than the current drive) and directory to which you want to change.

- **[..]** – Specifies that you want to change to the parent folder. Use a space between **chdir** and the two periods.

CHKDSK

Chkdsk creates and displays a status report for the disk, and it also lists and corrects errors on the disk. You have the following parameters available:

```
chkdsk [drive:] [/p] [/r]
```

- **none** – Used without parameters, **chkdsk** displays the status of the disk in the current drive.
- **drive:** – Specifies the drive that you want **chkdsk** to check.
- **/p** – Performs an exhaustive check even if the drive is not marked for **chkdsk** to run. This parameter does not make any changes to the drive.
- **/r** – Locates bad sectors and recovers readable information. Implies **/p**.

CLS

This command simply clears the screen. Once cleared, you only see the command prompt and insertion point.

COPY

The **copy** command copies a single file to another location. The source of the copy can be any removable media disk, the current Windows installation, the root of any drive, or the Cmdcons directory. You have the following parameter options, but note that copy doesn't support wildcard characters.

```
copy source [destination]
```

- **source** – Specifies the location and name of the file to be copied. Source can consist of a drive letter and colon, a directory name, a filename, or a combination.
- **destination** – Specifies the location and name of a file or set of files to which you want to copy. Destination can consist of a drive letter and colon, a folder name, a filename, or a combination.

DELETE

Delete deletes a single file. You have the following parameters:

```
delete [drive:][path] filename or del [drive:][path] filename
```

DIR

Dir displays a list of the files and subdirectories in a directory. You have the following parameters:

```
dir [drive:][path][filename]
```

- **[drive:][path]** – Specifies the drive and directory for which you want to see a listing.
- **[filename]** – Specifies a particular file or group of files for which you want to see a listing. You can use multiple filenames. Spaces, commas, or semicolons can separate filenames. You can use wildcard characters (? and *) in the filename parameter to display a group of files.

DISABLE

The **disable** command disables a Windows XP, Windows 2000, or Windows NT 4.0 system service or device driver. You have the following parameters:

```
disable {[service_name] | [device_driver_name]}
```

- **service_name** – The name of the system service you want to disable
- **device_driver_name** – The name of the device driver you want to disable

DISKPART

Diskpart creates and deletes partitions on a hard drive. You have the following parameters:

```
diskpart [/add | /delete] [device_name | drive_name |
partition_name] [size]
```

- **none** – Used without parameters, the **diskpart** command starts the Windows character-mode version of **diskpart**.
- **/add** – Creates a new partition.
- **/delete** – Deletes an existing partition.
- **device_name** – The device on which you want to create or delete a partition. The name can be obtained from the output of the **map** command.
- **drive_name** – The partition you want to delete, by drive letter. Used only with **/delete**.

- **partition_name** – The partition you want to delete, by partition name.
- **size** – The size, in megabytes (MB), of the partition you want to create. Used only with **/add**.

ENABLE

The **enable** command enables a Windows XP, Windows 2000, or Windows NT 4.0 system service or driver. You have the following parameters:

```
enable {service_name | device_driver_name} [startup_type]
```

- **service_name** – The name of the system service you want to enable.
- **device_driver_name** – The name of the device driver you want to enable.
- **startup_type** – The startup type that you want to designate for the service or device driver. Valid startup types are SERVICE_BOOT_START, SERVICE_SYSTEM_START, SERVICE_AUTO_START, SERVICE_DEMAND_START.

EXIT

This command closes the Recovery Console.

EXPAND

The **expand** command extracts a file from a compressed file. This command is used to extract a file from the cabinet (.cab) file or another compressed file. Do not extract the entire cabinet file, as the process is lengthy; instead, extract only the file you need. You have the following parameters:

```
expand source [/f:filespec] [destination] [/d] [/y]
```

- **source** – Specifies the file to expand. Use this if the source file contains a single file. Source can consist of a drive letter and a colon, a directory name, a filename, or a combination. You cannot use wildcard characters.
- **/f:filespec** – If the source contains more than one file, this specifies the name of the file you want to extract. You can use wildcards for the files you want to extract.
- **destination** – Specifies both the destination directory and filename for the extracted file, or each individually.
- **/d** – Lists the files contained in the cabinet file without expanding it or extracting from it.
- **/y** – Suppresses the overwrite prompt when expanding or extracting files.

FIXBOOT

The **fixboot** command writes a new boot partition sector to the system partition. The command is simply **fixboot** [drive] where *drive* is the drive letter where the new boot sector will be written.

FIXMBR

The **fixmbr** command repairs the master boot record of the boot disk. The full command is **fixmbr** [device_name] where *device_name* is the device (drive) on which you want to write a new master boot record.

FORMAT

The **format** command formats the specified drive with the file system you choose. You have the following parameters:

```
format [drive:] [/q] [/fs:file-system]
```

- **drive:** – Specifies the drive you want to format. You cannot format a floppy disk from the Recovery Console.
- **/q** – Performs a quick format of the drive. The drive is not scanned for bad areas, so you should use this parameter only on drives that you have previously formatted.
- **/fs:file-system** – Specifies the file system to use (FAT, FAT32, NTFS). If you don't specify a file system, the existing file system format is used.

HELP

The **help** command provides a listing of Recovery Console commands and parameters. See the Help section for listings and examples.

LISTSVC

The **listsvc** command lists all of the services and drivers on the computer.

LOGON

This command logs you on to the desired Windows XP installation. You must have local administrator privileges to log on to the Recovery Console.

MAP

The **map** command displays a mapping of drive letters to physical device names. The command is helpful when you want to use the fixboot and fixmbr commands, because you need to see the mappings to use those commands. The syntax is map [arc] where *arc* instructs the map command to display Advanced RISC Computing (ARC) device names, such as multi(0)disk(0)rdisk(0)partition(1). See the Windows XP Help and Support Center to learn more about ARC paths.

MKDIR (MD)

The **mkdir** or **md** command creates a directory or subdirectory. You have the following available parameters:

```
mkdir [drive:]path or md [drive:]path
```

- **drive:** – Specifies the drive on which you want to create the new directory.
- **path** – Specifies the name and location of the new directory. You cannot use wildcard characters.

MORE

The **more** command displays the contents of a text file. You have the following parameters:

```
more [drive:][path] filename or type [drive:][path] filename
```

- [drive:][path] filename – Specifies the location and name of the file that you want to view

NET USE

The **net use** command connects a network share to a drive letter. You have the following parameters:

```
net use [\\ComputerName\ShareName [/user:[DomainName\]UserName]
password] | [drive letter:] [/d]
```

- **\\ComputerName\ShareName** – Specifies the name of the server and the shared resource. If ComputerName contains blank characters, enclose the entire computer name from the double backslash (\\) to the end of the computer name in quotation marks. The computer name can be from 1 to 15 characters long.
- **/user:** – Specifies the username with which the connection is made.
- **DomainName** – Domain name to use when validating the credentials for the user.
- **UserName** – Specifies the username with which to log on.
- **Password** – Specifies the password needed to access the shared resource. Leave blank to produce a prompt for the password.
- **/d** – Indicates that this connection is to be disconnected.

RENAME (REN)

Rename or **ren** changes the name of a single file. You have the following parameters:

```
rename [drive:][path] filename1 filename2  or ren [drive:][path]
filename1 filename2
```

- **[drive:][path] filename1** – Specifies the location and name of the file you want to rename. You cannot use wildcard characters.
- **filename2** – Specifies the new name for the file. You cannot specify a new drive or path when renaming files.

RMDIR (RD)

Rmdir or **rd** deletes a directory. You have the following parameters:

```
rmdir [drive:]path  or rd [drive:]path
```

- [drive:]path – Specifies the location and name of the directory you want to delete. You cannot use wildcard characters.

SET

The **set** command displays and sets Recovery Console environment variables. The set command is an optional command that must be used with Security Templates. The command is **set [variable=[string]]** where *variable* specifies the variable you want to set or modify.

SYSTEMROOT

The **systemroot** command gets the current directory to the systemroot folder of the Windows installation you are logged on to.

TYPE

Type displays the contents of a text file. You can use the **type** or **more** command to view a text file without modifying it. You have the following parameters:

```
type [drive:][path] filename or more [drive:][path] filename
```

- [drive:][path] filename – Specifies the location and name of the file that you want to view.

Removing the Recovery Console

If you installed the Recovery Console as a startup option, you can later choose to remove it, if necessary. See the following steps for details:

1. Open My Computer.
2. Double-click the hard drive on which you installed the Recovery Console.
3. On the Tools menu, click Folder Options.
4. Click the View tab.
5. Click Show hidden files and folders, clear the Hide protected operating system files check box, and then click OK.
6. At the root directory, delete the \Cmdcons folder.
7. At the root directory, delete the file Cmldr.
8. At the root directory, right-click the Boot.ini file and then click Properties.
9. Clear the Read-only check box, and then click OK.
10. Open Boot.ini in Notepad, and remove the entry for the Recovery Console. It will look similar to this:

    ```
    C:\cmdcons\bootsect.dat="Microsoft Windows Recovery Console"
    /cmdcons
    ```

11. Save the file and close.

Chapter 20

Customizing with Windows XP PowerToys

IN THIS CHAPTER

- Downloading and installing PowerToys
- Exploring PowerToys

POWERTOYS ARE SIMPLE APPLICATIONS you can download for free from Microsoft.com. They are typically developed as an afterthought to an operating system, and they add some helpful and fun customization options to Windows XP. Windows XP is certainly not the first operating system to have PowerToys available for download, but PowerToys are refined for Windows XP and, generally, you'll find them useful in some different ways. This chapter takes a look at the PowerToys, shows how to use them, and explains how they can help you customize your Windows XP experience.

Checking Out PowerToys

PowerToys are a collection of software applications. Each miniapplication is designed to perform a specific task or function. You can download all of the PowerToys from Microsoft, or you can choose the specific toys you want to use and download only those. At the time of this writing, the PowerToys listed in Table 20-1 are available:

TABLE 20-1 AVAILABLE POWERTOYS

Toy	Description
Tweak UI	This PowerToy allows you to configure some system settings that are not readily available in the Windows XP user interface.

Continued

TABLE 20-1 AVAILABLE POWERTOYS *(Continued)*

Toy	Description
Open Command Window Here	This tool adds an "open command window here" context menu option on file system folders so you can easily get to the command line from within a folder.
ALT-tab Replacement	This PowerToy gives you the ease of switching between pages and seeing a preview of those pages.
Power Calculator	This PowerToy provides graph and evaluate functions along with many different types of calculating conversions.
Image Resizer	This PowerToy enables you to resize one or several image files at the same time simply by right-clicking them.
CD Slide Show Generator	This tool allows you to view images burned to a CD as a slide show. This tool also works on Windows 9*x* and Me computers.
Virtual Desktop Manager	You can manage up to four desktops on your Windows XP computer from the Windows taskbar with this PowerToy.
Taskbar Magnifier	You can easily magnify part of your Windows XP screen from the taskbar using this tool.
HTML Slide Show Wizard	You can easily create an HTML slide show of your digital pictures that can be viewed locally or uploaded to a Web site.
Webcam Timershot	Use this tool to take pictures at specified time intervals from a Webcam connected to your computer, and then save them to a desired location. It's your own mini-surveillance camera.

Downloading and Installing PowerToys

You can easily download and install PowerToys on your Windows XP computer. Most of the PowerToys are between 500 and 600 KB in size, and you download

them one at a time. Even with a slower modem connection, you'll still be able to complete the downloads to your computer.

To download PowerToys, point your Web browser to `www.microsoft.com/windowxp/pro/downloads/powertoys.asp`. This will take you to the PowerToys main page, shown in Figure 20-1.

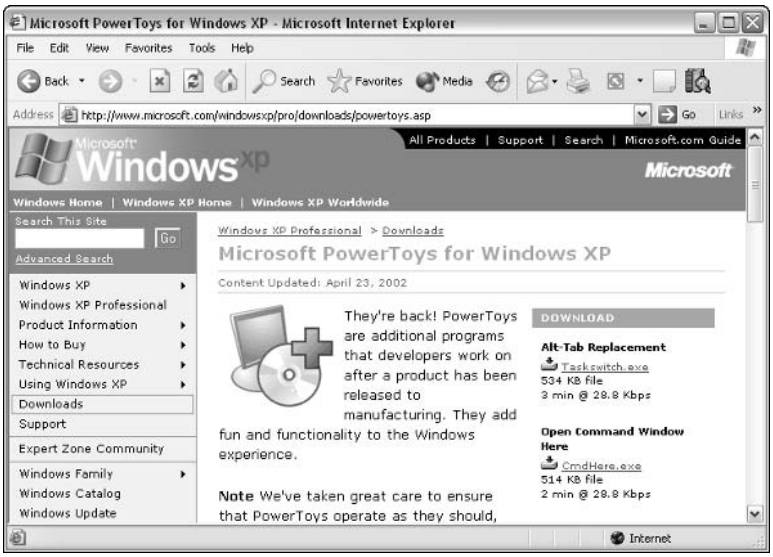
Microsoft PowerToys for Windows XP - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.microsoft.com/windowsxp/pro/downloads/powertoys.asp
Go Links
All Products | Support | Search | Microsoft.com Guide
Windows xp
Microsoft
Windows Home | Windows XP Home | Windows XP Worldwide
Search This Site
Go
Advanced Search
Windows XP
Windows XP Professional
Product Information
How to Buy
Technical Resources
Using Windows XP
Downloads
Support
Expert Zone Community
Windows Family
Windows Catalog
Windows Update
Windows XP Professional > Downloads
Microsoft PowerToys for Windows XP
Content Updated: April 23, 2002
They're back! PowerToys are additional programs that developers work on after a product has been released to manufacturing. They add fun and functionality to the Windows experience.
Note We've taken great care to ensure that PowerToys operate as they should,
DOWNLOAD
Alt-Tab Replacement
Taskswitch.exe
534 KB file
3 min @ 28.8 Kbps
Open Command Window Here
CmdHere.exe
514 KB file
2 min @ 28.8 Kbps
Internet

Figure 20-1: PowerToys home page.

Before you begin downloading PowerToys, you should note the following:

- PowerToys are created but not supported by Microsoft. In other words, you can't get technical support from Microsoft for their use. Basically, you are on your own, but they are generally easy to use and are problem free.
- If you have old PowerToys installed on your computer, you need to uninstall them before downloading and installing new PowerToys.
- PowerToys only work with U.S.-English regional settings.
- Most PowerToys are user-specific. This means you can use the PowerToys to customize your XP system, but the customization applies only to you — not others who have an account on the local computer.

To download the PowerToys, follow these steps:

1. Click the desired PowerToy link on the right side of the PowerToys home page (see Figure 20-1).

2. A dialog box appears, asking if and where you want to save the PowerToy. You can choose Open, which will start the download and installation, or just click Save to download the PowerToy without installing it.
3. If you choose to download the PowerToy without installing it, just double-click the download icon after the download is complete to install the PowerToy. This will walk you through a very basic setup routine.
4. After you install the PowerToys, you'll be able to access them through Start → All Programs → PowerToys for Windows XP.

The following sections explore each PowerToy and show you how to use it.

Tweak UI

Tweak UI (User Interface) is a little tool that gives you access to some standard system settings that you can't configure through the default Windows XP tools and interface. You'll find some of these settings really useful, while a few won't seem as important. Fortunately, the tool is easy to use, and you can mix and match any of the settings that you want to use. Essentially, the tool gives you an interface to these settings, and you can change them, as you like, just as you would do with a standard properties dialog box.

The Tweak UI interface, shown in Figure 20-2, gives you a left column with different setting categories. Expand a category and choose a setting, and you'll see the configurable options in the right pane. The following sections show you what is available in each category.

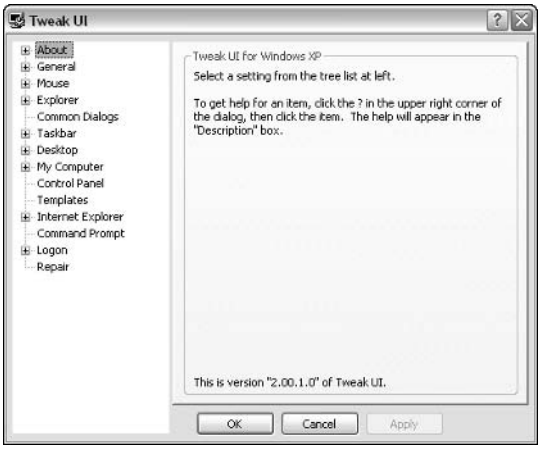

Figure 20-2: Tweak UI interface.

About

The About option gives you a series of tips for using the Tweak UI interface, and the Policy option under About gives you direct access to the Group Policy Editor, where you can make a number of changes and enforce policies across all users on the Windows XP local computer (assuming you are the computer administrator). See Chapter 2 to learn more about using the Group Policy Editor.

General

The General category has only one entry, called Focus. Using this option, you can prevent applications from stealing focus. This setting prevents applications from stealing focus from the current window you are working on. Rather than stealing focus, the taskbar icon for the application will flash, letting you know the application needs your attention. Simply enable the setting and choose the taskbar flashing option you want (continuous or flash a certain number of times).

Mouse

The Mouse category gives you several settings to control mouse movements and behavior. As you can see in Figure 20-3, you can manage the menu speed and mouse sensitivity to double-clicking and dragging. Under the Mouse category are the following subcategories:

- The Hover category allows you to adjust your mouse hover sensitivity and hover time.
- The Wheel category allows you to manage scrolling using the mouse wheel.

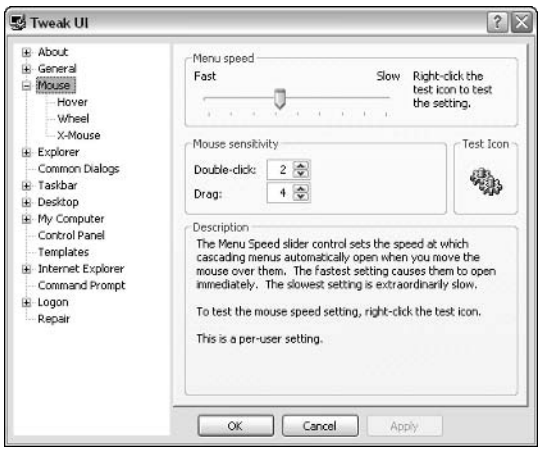

Figure 20-3: Mouse options.

- The X-Mouse option allows you to configure activation for windows that follows the mouse movements. This keeps you from having to click the mouse to bring a window into focus.

Explorer

The Explorer section gives you a number of settings that control some basic Windows interface functionality. If you select the Explorer category, you see a number of check box options that enable you to manage different features of Windows. You'll see everything from the displaying of Help on the Start menu to enabling Windows hotkeys. Select a setting, and you can read more about the features of each one on the description section of the page.

If you expand Explorer and select Common Dialogs, you can create a Custom Places bar where you show either default places or custom places you choose, such as My Documents, My Music, History, and so forth. Overall, this option gives you more flexibility to easily get to the items you most frequently use.

Taskbar

The Taskbar category gives you several setting options to manage your taskbar. If you select the Taskbar category, you can choose to enable balloon tips and receive a warning when disk space runs low. If you select Grouping under the Taskbar category, you can configure how applications are grouped on the taskbar. For example, you can group least-used applications first, and you can group applications with the most windows first. If you select XP Start Menu under Taskbar, you can choose whether to list certain programs on the frequently used programs section of the Start menu. Simply click or clear the desired check boxes next to each application.

Desktop

On the Desktop category, you can choose what icons you want to display on the desktop. By default, Windows XP only displays the Recycle Bin on the desktop, but you can easily add the following by selecting the available check boxes:

- Internet Explorer
- My Computer
- My Documents
- My Network Places

Under the Desktop category, you can also manage the First Icon option. You can choose to have My Documents or My Computer displayed first on the desktop. Note that this is a per-user setting that only works if the user has permission to alter My

Computer settings. Also, you may need to log off and back on for the setting to take effect.

My Computer

The My Computer option allows you to manage which drives and folders you see in My Computer. Simply expand this category and choose Drives, Special Folders, or AutoPlay. You can determine what you see in My Computer from these options and determine what is done with AutoPlay for each icon or folder.

Under the Control Panel section of My Computer, you can choose to enable or hide certain Control Panel icons. For example, you can hide accessibility options, add hardware, and so forth. Some people use this option to make the Control Panel neater by removing icons that are not typically used. Note that removing the options here only removes the icon from the Control Panel — it does not uninstall the Control Panel option. You can add the icons back at any time by simply returning to this Windows option and enabling the desired check boxes.

Under the Templates option, you can control what kind of document Windows offers to make when you right-click and select New from the menu. Just enable or clear the desired check boxes here, as desired.

Internet Explorer

Under the Internet Explorer section, you can choose to use a custom toolbar background for Internet Explorer by selecting the option and clicking the Change button to select a new bitmap image you have on your computer. This feature allows you to customize Internet Explorer with your own bitmap image.

Under the Internet Explorer category, you can edit the search function so that searches within Internet Explorer are directed to certain search engines. Under View Source, you can manage what program is used to view Web page source code (it is Notepad by default).

Under the Command Prompt option, you can choose a couple of completion options that determine the character used for command prompt filename completion. You can also specify word separators.

Logon

The Logon option allows you to determine the users that appear on the Welcome screen and whether the Autoexec.bat file is parsed at logon (this option is selected by default). You can select the Autologon option and have the system log you on automatically at system startup, and you can also configure whether or not to show unread e-mail on the Welcome screen.

Finally, you also see a Repair option that you can use to have Tweak UI rebuild icons and remove unused icons from Explorer. From the drop-down menu, you can choose different folders you want to repair, such as the Fonts folder, My Music, My Pictures, and so forth.

Open Command Window Here

This little PowerToy gives you a contextual menu option to open a command window from any file system window that you happen to be working in. All this feature does is prevent you from having to go to Accessories to open a command prompt, or from having to click Start→Run and entering **cmd** to open a command prompt. As you can see in Figure 20-4, in My Computer, you can simply right-click any icon and have an Open Command Window Here context menu option. Clicking this immediately opens a command window. This feature is really helpful if you use the command prompt frequently.

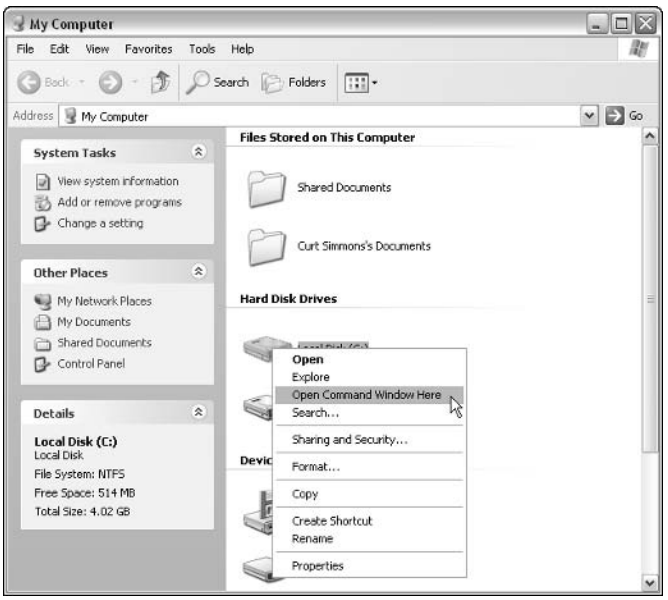

Figure 20-4: Open Command Window Here.

ALT-Tab Replacement

You can use the ALT-Tab keys to toggle between multiple windows on your screen. The ALT-Tab Replacement PowerToy gives you an enhancement to ALT-Tab. After you install the ALT-Tab Replacement PowerToy, you get a small window showing the actual content of the windows you want to switch to. Basically, this little option can make using multiple windows in the same application easier because you can see exactly what you are switching to before doing so. Just press ALT-Tab, then continue holding the ALT key to use your mouse or keyboard arrow keys to select the window to which you want to toggle.

PowerToy Calculator

The PowerToy Calculator performs graphing functions and other conversions that are not available on the standard Windows XP calculator. As you can see in Figure 20-5, the PowerToy Calculator contains standard charting and graphing features. Use the Functions menu to access basic operations, trig functions, log functions, and user functions. On the Conversions menu, you can easily convert the following to different values:

- Length
- Mass
- Time
- Velocity
- Temperature

Use the View menu to access numeric, history, and advanced views, and check out File → Help to learn more about using different functions and features.

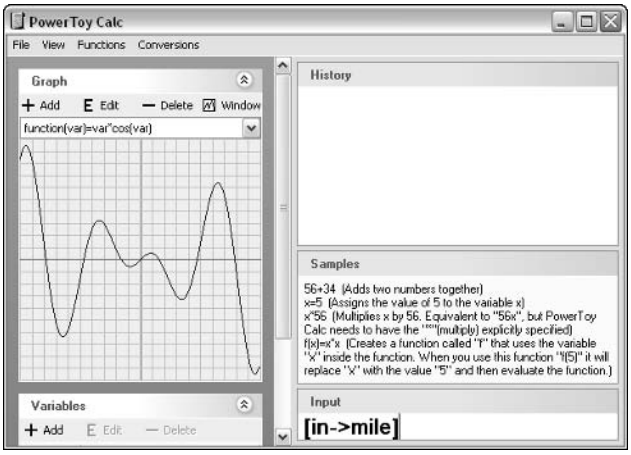
PowerToy Calc
File View Functions Conversions
Graph
Add Edit Delete Window
function(var)=var*cos(var)
History
Samples
56+34 (Adds two numbers together)
x=5 (Assigns the value of 5 to the variable x)
x*56 (Multiplies x by 56. Equivalent to "56x", but PowerToy Calc needs to have the "*"(multiply) explicitly specified)
f(x)=x*x (Creates a function called "f" that uses the variable "x" inside the function. When you use this function "f(5)" it will replace "x" with the value "5" and then evaluate the function.)
Variables
Add Edit Delete
Input
[in->mile]

Figure 20-5: PowerToy Calculator.

Image Resizer

Image Resizer is a great little tool if you work with digital images on a frequent basis. You can use Image Resizer to quickly and easily resize images or groups of images, as needed. This feature prevents you from having to open the image(s) in an image editor and resize them through that program. Once installed, just follow these steps to resize your images.

1. Right-click on an image or collection of images, as desired. On the Context menu that appears, you'll see the option to Resize Pictures, as shown in Figure 20-6. Click the option.

Figure 20-6: Right-click the image to see the Context menu.

2. In the Resize Pictures dialog box that appears (see Figure 20-7), choose the size to which you want to resize the photos. This action creates a copy of the photos and stores them in the current folder. It does not alter your original photos.

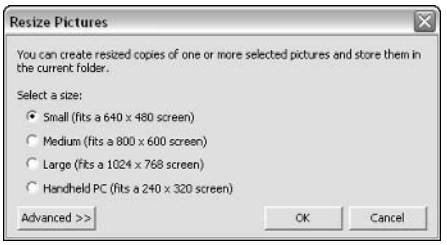
Resize Pictures
You can create resized copies of one or more selected pictures and store them in the current folder.
Select a size:
Small (fits a 640 x 480 screen)
Medium (fits a 800 x 600 screen)
Large (fits a 1024 x 768 screen)
Handheld PC (fits a 240 x 320 screen)
Advanced >>
OK
Cancel

Figure 20-7: The Resize Pictures dialog box.

3. Click the Advanced button to extend the options, as shown in Figure 20-8. You can create a custom size, choose to make photos smaller but not larger, and you can choose to resize the original photo, if desired. Click OK when you're done.

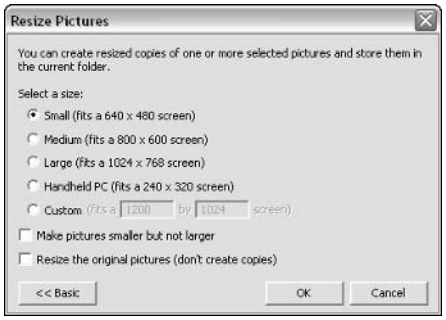
Resize Pictures
You can create resized copies of one or more selected pictures and store them in the current folder.
Select a size:
Small (fits a 640 x 480 screen)
Medium (fits a 800 x 600 screen)
Large (fits a 1024 x 768 screen)
Handheld PC (fits a 240 x 320 screen)
Custom (fits a 1200 by 1024 screen)
Make pictures smaller but not larger
Resize the original pictures (don't create copies)
<< Basic
OK
Cancel

Figure 20-8: Advanced options.

Exercise caution when resizing original photos. You can reduce photo quality if you reduce a photo's size, and this might prevent you from using the photo for certain printing needs. As a general rule, always maintain your original photo and select to make a copy of the photo when resizing.

CD Slide Show Generator

This PowerToy allows you to view photos on a CD as a slide show. When you open the CD, you'll see a View as a slide show link under Picture Tasks, as shown in Figure 20-9. After you click the link, the photos will be displayed full screen, one at a time, and will automatically advance after a period of a few seconds (you can manually advance them by clicking your mouse button). The slide show will continue to loop through all of the photos until you press the ESC key on your keyboard.

Figure 20-9: CD slide show.

Virtual Desktop Manager

The Virtual Desktop Manager allows you to use up to four different desktops on your Windows XP computer at the same time, just by toggling between them using the taskbar. For example, one desktop can have one background and applications open while another can use a different background and applications. You'll see a Taskbar icon where you can simply click between the different desktops. It's like having up to four computers in one!

To use the Virtual Desktop Manager, first install it, and then follow these steps:

1. Right-click on an empty area of the taskbar, then point to Toolbars. In the submenu that appears, shown in Figure 20-10, click Desktop Manager.

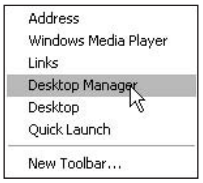

Figure 20-10: Desktop Manager.

2. The Desktop Manager now appears on the toolbar, as shown in Figure 20-11.

Figure 20-11: Desktop Manager on the toolbar.

3. To switch between desktops, simply click each one, and then change each desktop, as desired. You can adjust the background and applications open on each desktop. After you have configured the desktops you want, you can simply click between them using the Desktop Manager icons on the Taskbar.
4. To see a preview of your desktops (see Figure 20-12), click the green Preview button next to the desktop buttons on the Desktop Manager. You'll see each desktop on the screen and you can click between them.

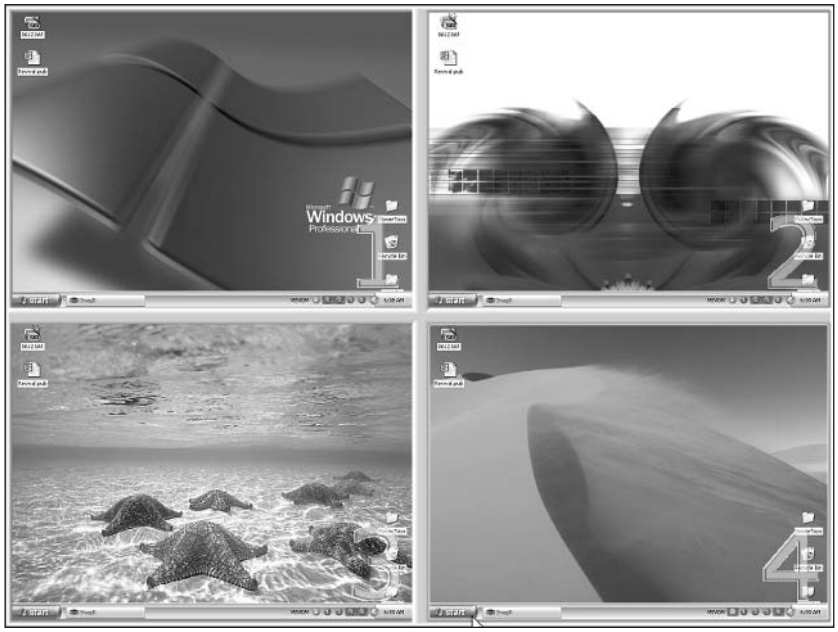

Figure 20-12: Desktop Preview option.

Taskbar Magnifier

So, say you have some problems seeing some of the things that appear on your screen, or you have to work with a bunch of small icons or other small text issues on the screen. The Taskbar Magnifier may be able to help you. This magnifier is a lot like the magnifier you can use from Accessibility Options in the Control Panel, but this one will stay on your taskbar as an icon until you turn it off.

Simply install the Taskbar Magnifier, right-click an empty area of your Taskbar, point to Toolbars, and then click Taskbar Magnifier. The Magnifier appears on your Taskbar. Anything you move your mouse over appears in the magnifier area. For example, in Figure 20-13, I am pointing to a folder; you can see the folder icon appear in the magnifier on the Taskbar.

Figure 20-13: Taskbar Magnifier.

HTML Slide Show Generator

The HTML Slide Show Generator is a wizard you can use to assemble a collection of digital photos into a slide show. Once the slide show is made, you can view it in any browser, so you can easily e-mail it to someone, burn it to a CD, or upload it to your Web site. After you install the HTML Slide Show Generator, just follow these steps:

1. Click Start → All Programs → PowerToys for Windows XP → Slide Show Wizard.
2. Click Next on the Welcome screen.
3. On the Image window, use the Add Image and Add Folder buttons to add images and folders to your collections. All of the photos you add here will be used in the slide show, as shown in Figure 20-14.

Slide Show Wizard
Click Add Image or Add Folder to add your pictures, then drag them into the order you prefer.
Add Image
Add Folder
Remove
Remove All
< Back
Next >
Cancel

Figure 20-14: Add Images or Folders.

4. In the slide show options window, enter a name for the slide show and your name for the author (if you like). By default, the slide show is saved in My Documents\My Slide Shows, but you can change the location by clicking the Browse button and selecting a different location. Under the Picture size category, choose a desired picture size. Keep in mind that if you are posting the photo to the Web, smaller sizes such as 640×480 work best. If you are going to be using the slide show on your computer only or on a CD, choose a larger size or keep the current size. Under the Slide show type category, you can choose between simple and advanced, and you can also choose to display the slide show full screen (see Figure 20-15). Make your selections and click Next.

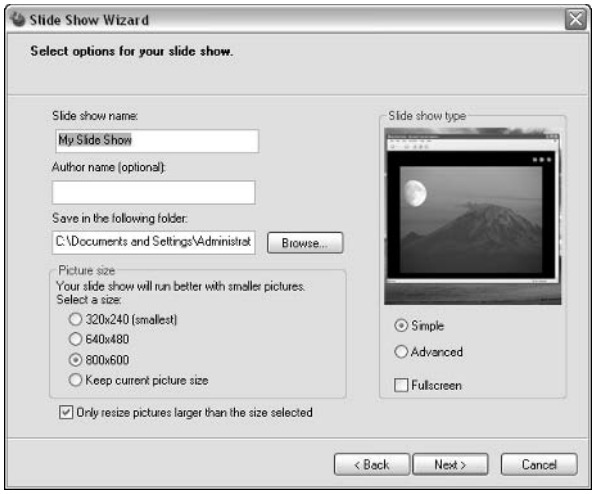

Figure 20-15: Slide show options.

5. The slide show is created and you arrive at the Finish screen. Note that you can view the slide show from this completion window by clicking the View the Slide Show Now button. Figure 20-16 shows you a sample slide show being played in fullscreen.

Figure 20-16: Slide show in fullscreen mode.

Webcam Timershot

The Webcam Timershot PowerToy uses a Webcam attached to your PC to take photos at specified intervals. Basically, it is a way to create a collection of photos of a room or office, for example, primarily used for security purposes. After you install the Webcam Timershot, click Start → All Programs → PowerToys for Windows XP → Timershot. The window that appears allows you to see the photos taken, and you can adjust the properties for the timershot. For example, you can determine how often to take a photo, where to save the photo, and whether to save all photos or just the last photo taken. You can even save your photos to a network location so you can take photos of a remote location and see them from a network share.

Chapter 21

Scripting with Windows XP

IN THIS CHAPTER

- Understanding Scripting
- Scripting with Windows XP

IF YOU ARE INTERESTED in getting Windows XP to do more than what is available in the operating system, scripting might be for you. If you are a savvy computer user, you can do all kinds of customization and automation using scripting. Windows XP supports all of the scripting options and features you might want, and you'll have fun using scripts within Windows XP. If you are new to scripting, this chapter gives you an overview of how scripting works and some examples of what you can do on Windows XP.

Understanding Scripting

So what is scripting anyway? Scripting is a form of programming, in the sense that you create code using an editor, such as a simple text editor like NotePad. This code contains instructions for your computer to perform. These instructions can be later compiled into an application, as is often the case with higher-level languages like C/C++ and VB .NET, or the code can be interpreted. Interpreted code is not compiled into a standalone application; rather, it depends on the existence of other applications running on the system to read the code and perform the instructions contained within. To illustrate this example, look at Figures 21-1 and 21-2. Notice that the compiled application in Figure 21-1 contains all of the elements needed to carry out the programmer's instructions. The interpreted code, or script, in Figure 21-2 requires an interpreter (sometimes called a *script engine*) capable of reading the instructions in the file and executing them as specified by the programmer who wrote them.

One of the benefits of compiled code is that the resulting application (what the code becomes once it is compiled) tends to execute very quickly when compared to the performance of interpreted code. The benefit of interpreted code is that it is often platform-independent; that is, one set of the code can be executed on a variety of operating systems without changing the code. JavaScript, Visual Basic Script (VBScript), and PHP are famous examples of interpreted languages. All of the scripts that you build in Windows XP make use of interpreted code.

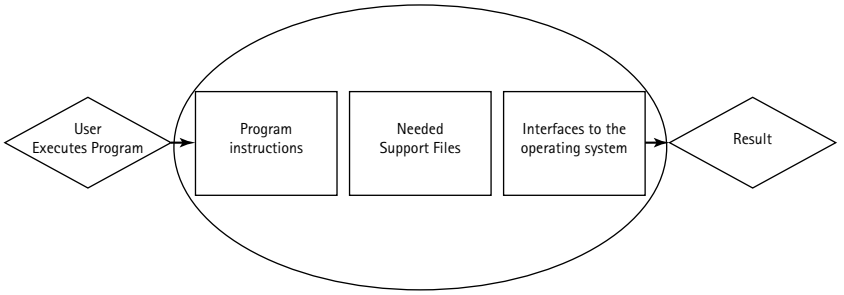

Figure 21-1: Using a compiled program.

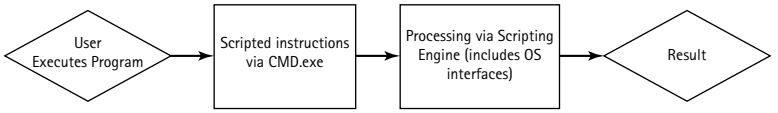

Figure 21-2: Using an interpreted script.

What can you use scripting for? One of the most common uses for scripting is the automation of systems management processes. Under Windows XP (as well as Windows 2003 Server and Windows 2000), you can make scripts to automate an amazing array of processes. For example, you can use a simple batch file to map network drives for your users. As a user logs on, the batch file (a type of script) executes and runs a series of commands to map network drives. You can make use of some of the more powerful scripting engines to change systems settings based on the users group, configure networking settings, edit the Registry, or even create new dial-up profiles. However, scripting is not just for customizing the environment at user logon. There are handy scripts that will allow you to automate, for example, the process of doing virtually any Windows administration task. All you have to do is provide the variable information (such as usernames if you are creating users), and the rest is handled while you do something else more interesting or productive. You could launch these files manually, or you could use the Windows Scheduler to execute them at predetermined times.

What scripting languages are supported within Windows XP? Without adding third-party scripting engines, which you can and many people do, you can make use of Batch Scripting, JScript, and VBScript.

Batch Scripting Overview

Batch scripting is probably the most common form of Windows scripting, and if you have even a little Windows scripting experience, there is a good chance that you have encountered a Windows batch file or two. Though it is possible to use other file extensions, batch files typically make use of the .bat or .cmd file extension. The files are used to run simple system commands. To create the file, you can open any text editor, such as notepad, enter the scripting information, and then

save the text file with the proper extension. Any command you can run from a command line on a Windows operating system can be inserted verbatim into a batch file for execution. While batch files lack the complexity of the higher-level scripting languages available (VBScript and JScript), they can be used to accomplish a variety of useful tasks, and multiple simple scripts can be nested to accomplish more complex tasks. This is particularly useful because it's pretty easy to learn the basic syntax used in batch files. This is especially good if you are new to scripting, because you are more likely to have scripting success right away. Because of this accessibility and its ubiquitous usage, batch scripting is the primary focus of this chapter.

JScript Overview

The JScript language is marketed as an object-based, interpreted scripting language. It is fair to say that the capabilities of JScript (as well as VBScript) wholly exceed those of relatively simple batch scripting. While JScript does not approach the speed (it is interpreted after all), complexity, or power of more robust programming languages, it does serve as a nice intermediary language useful for a variety of tasks. Oddly enough, one of the limitations of the language is that no native support is provided for reading and writing to files. This task is relatively simple in the less robust batch-scripting environment. The JScript language's developers are quick to point out that this is not JavaScript, nor is it really related to the Java languages. The JScript language is used frequently on the Internet (like JavaScript) and can be processed by any of several compatible interpreters, such as Active Server Pages, Windows Scripting Host, and Internet Explorer.

If you are familiar with higher-level programming languages, you might have strong feelings about a few JScript traits. In JScript, you cannot declare data types, such as the char or int types used in many programming languages. This means

The .NET difference

The .NET languages, including JScript .NET, are not the same thing as their non-.NET equivalents. There is improved performance and flexibility in the new generation of languages, so if programming in general is a serious interest, I highly recommend you begin learning the basics of the .NET languages. In some cases, the .NET revision of the language adds more functionality than the previous iteration, while still remaining backward-compatible with the previous (in our case) scripting languages. However, this is certainly not the case in all instances; for example, Visual Basic .NET and its predecessor, Visual Basic, are for all practical purposes entirely different languages that share little more than some common syntax and the words Visual Basic in their name. To make use of the .NET variants with Windows XP, you will need the current .NET support files and runtimes installed on your system. I am assuming that you are not making use of the .NET architecture in your scripting development.

Windows Script File

If you are mixing the various scripting languages supported by Windows XP and you would like to use a single file to house the individual bits of scripting languages, you can use a file format called the Windows Script File. This file type is an unformatted text file like the other scripting types and carries the extension .wsf. When a script of this kind is executed, the Windows Scripting Host processes the script and uses the proper interpreter for each language that is encountered within the file. This functionality can be extremely useful if multiple developers are using different scripting languages, or if you wish to merge existing scripting source code into a single file. Essentially, the Windows Script File acts as a container for the various supported languages. For more information using the Windows Scripting File format, check out `http://msdn.microsoft.com` and search for Windows Script or .wsf.

that you have to be careful about mixing data types, or at least how you deal with them. Numbers can end up being stored as text if you're not careful, and can cause some peculiar outcomes if you are trying to develop overly complex applets with JScript that accept input from a range of sources. Because the data types cannot be defined, it is fairly simple to accidentally convert numbers into a character string.

VBScript Overview

Unlike JScript, Visual Basic Scripting edition (VBScript or VBS) is a derivative of another programming language, Visual Basic (VB). There is enough in common between VBScript, VB, and other variants of the language that proficiency in one language is very useful when and if you decide to begin working with one of the other variants. Like JScript, VBScript can be processed in a number of environments. VBS is also an interpreted language, and although it cannot be used to build standalone applications, it is very useful for building robust, interactive scripts.

The interpreter that allows the use of JScript and VBScript is the Windows Scripting Host. The Windows Scripting Host has a graphical interface that will allow you to run scripts that have the extensions .wsf, .vbs, or .js by double-clicking them. If there is a need to execute one of the scripts via a command line, you use the Command Line Scripting interface (CScript). For example, the CScript engine would allow you to call a .vbs script from the command line, within a batch of .wsf files, and have it execute properly.

Batch Scripting Basics

As mentioned earlier, batch files are probably the most widely used form of scripting with Windows. Because a batch file can use any command that you can execute from a command prompt, you have a relatively wide array of options at your

disposal. The collection of instructions is placed in an unformatted text file, and the resulting file is saved as either a .bat or .cmd file. For example, a batch file called "mybatchfile" would be named either mybatchfile.bat or mybatchfile.cmd. Along with the commands you can run from a prompt, some other commands can be added to a batch file to provide additional functionality. These commands are as follows:

- if
- goto
- for

These enable the creation of simple conditional expressions within the batch file. Each one of these operators has a set of variables and output options, which you will need to understand clearly if you plan on using them in your batch programming. To use the decision-making commands, you need to understand the concept of parameters and how they are used in batch files. After an exploration of the concept of batch parameters as well as batch file redirection, we will discuss the batch file commands and provide some examples of how to build your own batch files.

Throughout this chapter are sections of sample code indicating how the usage of the various batch parameters and commands works. Notice that in most of the code samples there are comments preceded by the *rem* statement. The rem statement tells the operating system to ignore the information on the same line as the statement. The result is the removal of the information on that line of the batch file from the script execution process. It is particularly important when you build your scripts to leave some simple kinds of notes indicating what it is you are trying to accomplish with a particular script or portion of a script. This way, if you or someone else needs to revisit the scripts at a later time, your objectives and logic will be discernable. Rem can also be used if you have a large batch where a portion of it is not working as expected and you wish to disable it without actually removing the code from the file.

Using Batch Parameters

Batch parameters allow you to work with a variety of environment setting information. For example, parameters allow you to create a batch file that accepts user input. A batch script file that contains instructions for backing up selected local files to a network location (called netback.bat, for argument's sake) could be configured to accept the source location (where to get the files from) and a destination location (where to send the files to). For example, a user might run the following command:

```
netbat.bat C:\files W:\mydirectory\files
```

To build a batch file that will accept the parameters, you must use one of the accepted parameter values for a Windows batch file. The values %0 through %9 are

considered valid, although %0 always refers back to the name of the batch file, so it's not very useful for letting users pass arguments on to the batch file itself. To give you an example, the following code defines two variables for the copy command. This works well, because the copy command expects the user to specify where to copy the files from and where to copy them to:

```
copy %1 %2
```

The user would then have to provide the needed information when invoking the batch file. It is important to note that the variables and/or arguments are stored in numerical order. The first value the user places after the name of the batch file becomes %1, the next %2, and so forth. This assumes you begin with %1, which you should always do to ensure the script executes as expected. You can make some other modifications to the % parameters, but they go beyond the scope of this chapter and beyond what most folks need when crafting their own batch files. If you would like to explore the topic more, you can do so at the following URL: http://www.microsoft.com/windowsxp/home/using/productdoc/en/default.asp?url=/windowsxp/home/using/productdoc/en/percent.asp. You can find this link by going to `www.microsoft.com`, searching for the term "batch parameters", and browsing to the results, immediately under the Product Information heading in the results file.

Using Batch Redirection Operators

A redirection operator is basically a special parameter that changes how the output of a command is used. A common example is the redirection of screen output to a text file. The operator that does this particular task is > and can prove extremely useful if you want to capture the output of commands that normally only display the results on the screen. For example, the following command reroutes the output of the dir (directory listing) command to a text file called direct.txt.

```
dir>direct.txt
```

Conversely, the < operator is used when you want to pull information from a file to be processed by the command you are running. So, if you wanted to display the contents of a file (direct.txt, in this case) in alphabetical order, you could open a command prompt and run the following command:

```
sort<direct.txt
```

Batch File Logic Commands

We will now return to the commands available for use within your batch files that can be used to make the system *do something*. The parameters examined in previous paragraphs will allow you to modify how these commands behave. The next sections

explore the most common commands that enable you to perform basic logic within the batch file: *if* and *goto*.

USING THE IF COMMAND

When using the **if** command to make decisions within a batch script, several values can be evaluated generally. Each option changes the kind of evaluation that you can make using the if command. Table 21-1 outlines the common if command uses and the relevant applications.

TABLE 21-1 COMMON IF COMMANDS

Command	Example	Use
if exist/if not exist	if exist C:\filename.txt. del C:\filename.txt	Determines the existence or absence of files, folders, and (mapped) drives.
if string/if not string	if string %1==launchweb start iexplore	Used to determine if two strings are the same or not. /i (if string /i ...) tells the process to ignore the case of the letter.
if errorlevel/if not errorlevel	if not errorlevel 1 echo The last operation failed	Evaluates the exit code (errorlevel) of the last command to run before the if errorlevel command. These codes are either 1 or 0.Typically, 1 indicates successful exit and 0 is a failure.

The general syntax of the if command and its options are as follows:

```
if/if not errorlevel number [success commands] [else expression]
if/if not stringA==stringB [success commands]  [else expression]
if/if not exist file/drive/directory [success commands]  [else
expression]
```

When using the if command (without the not modifier), the command that follows the if statement will only be executed if the evaluation is true. If the *not* modifier is used, the command will only be executed if the statement is false. The else statements are used to specify the actions to be taken in the event that the if condition is not met, as in the following code example:

```
if %1==run. start iexplore
else echo %1 is not valid
```

This code would evaluate the string passed by the user when executing the script and either launch a program (Internet Explorer) or return a message that the string (%1) is not valid.

USING THE GOTO COMMAND

If you would like to perform different actions based on the if/else logic, you can compartmentalize your batch file by making use of the goto command. The goto command tells the batch process where to go in the file to begin processing, or where to go for the next step. In the code shown in Figure 21-3, the script begins by directing the process to the start section. The : operator identifies the title of any particular section. Once the title is located, the batch process begins executing the instruction on the next line.

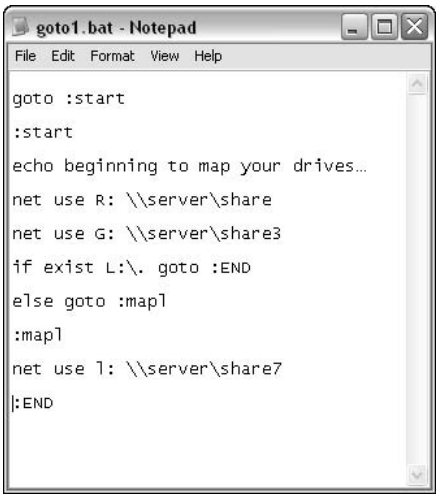

Figure 21-3: Goto sample.

In the case of the preceding code, a message is displayed and then some network drives are mapped. At the end of the script an evaluation is made. If the L:\ drive exists, the program will go to :END, which has no commands after it and causes the process to terminate. If the logic fails (there is no L:\ drive), the batch proceeds to the mapl section and maps the drive. You can use a goto command to direct the processing to an earlier section of the file. This allows you to create a recursive process. For example, see the code in Figure 21-4. You simply will not exit the script until both the R: and L: drives are mapped.

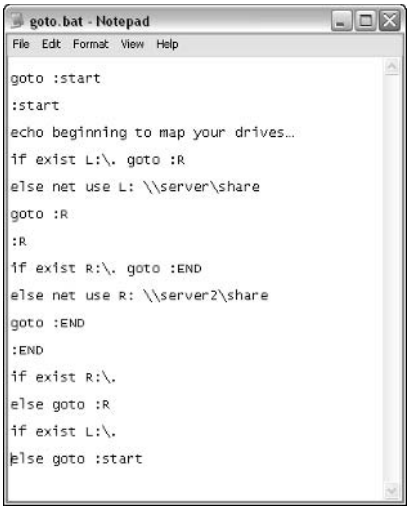

Figure 21-4: Recursive goto example.

Other Useful Operational Commands

Several other operational commands act as background operators to change how the batch process progresses. Rather than map a network drive, as the net use command (covered in the next section) can, these commands are used to display progress information to the user, pause batch processing, inactivate lines of code in the batch file without deleting them, and so forth. The syntax and usage of these commands are briefly explored here.

USING CALL

The call command is used to call another batch file from within a batch file. Take the following code line, for example:

```
if not exist C:\init.dat call init.bat
```

The line of code uses the now-familiar if statement to determine the existence of a file called init.dat. If the file does not exist in the location specified, C:\ in this case, the call command launches another script. In a typical batch file, the called script would execute and, upon completion, create the file that the original if statement is looking for. In this scenario, the tandem scripts ensure that if the batch file responsible for creating C:\init.dat has not been performed (and only then), the responsible batch file can be processed.

USING START

You might want to launch an actual, graphical application with your batch file. By making use of the start command, you can launch any installed application from the command line and pass to it any supported application variables. For example, if you wanted to have a batch file configure a new user's network hardware and then show that user the company network policy page on the intranet, you could build a script that makes use of the start command. See the example code in Figure 21-5.

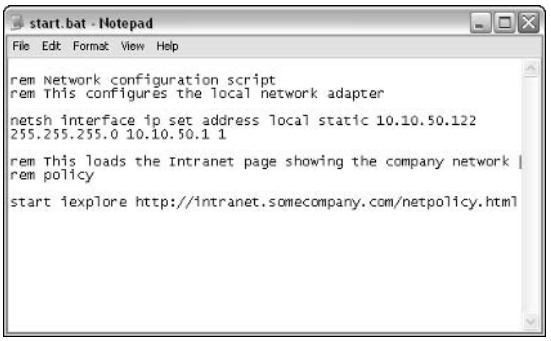
start.bat - Notepad
File Edit Format View Help
rem Network configuration script
rem This configures the local network adapter
netsh interface ip set address local static 10.10.50.122
255.255.255.0 10.10.50.1 1
rem This loads the Intranet page showing the company network
rem policy
start iexplore http://intranet.somecompany.com/netpolicy.html

Figure 21-5: Using start.bat.

Don't worry if you are not familiar with the netsh command; it's discussed a little later in this chapter. For now, take for granted that it is used to configure the local network interface, in this case, with a static IP address 10.10.50.122. After the interface is configured, the start command loads Internet Explorer (iexplore.exe) while passing it the address of the company network usage policy, netpolicy.html.

USING SETLOCAL AND ENDLOCAL

Suppose that you wish to use the start command as in the previous example, but you want to run an application located in a place that is not part of the current system environment. To start some program, you will first need to define the path to that application. To ensure that the environment variable you set is only valid during the execution of the script, you can make use of the SetLocal and EndLocal commands from within your batch file. SetLocal indicates that any environment variables changed after the SetLocal statements are temporary. The EndLocal statement tells the batch file when to undo the environment changes specified. Refer to Figure 21-6 for an example.

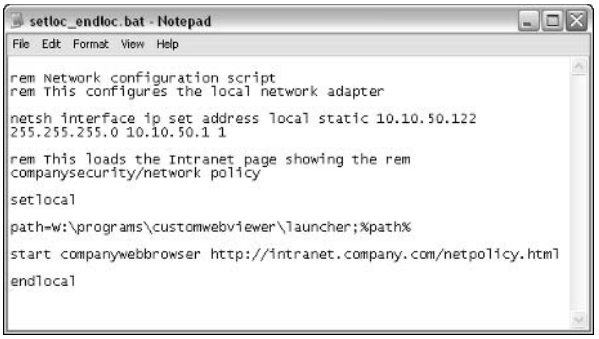

Figure 21-6: SetLocal and EndLocal example.

This time, instead of using Internet Explorer, the example used a program called companywebbrowser, located in the W:\programs\customwebviewer\launcher folder. The SetLocal/EndLocal statements allow you to temporarily add the relevant path to the systems list of known file paths (that is, places the system will look when you try to launch an application without the complete path in the file). You could also have started the application using the complete path, as in the following example:

```
start f:\folder\subfolder\application
http://intranet.company.com/netpolicy.html
```

The real advantage of the SetLocal and EndLocal commands becomes apparent if you need to repeatedly refer to the same file. For example, if you want to write the output from a command to a file and then display that file, or if you need to use a custom application multiple times with different parameters each time, SetLocal and EndLocal can help keep your script manageably small because the full path need only be entered once.

USING ECHO

If you want to control what information is displayed to the user while the script is executed, you can use the echo command to either hide the individual commands being executed, or to display a message to the user. For example, in the code sample in Figure 21-7, the @echo off statement hides all of the commands that it precedes. Without this command, the user would see each line as it was processed. The line “echo please enjoy your newly configured system” is a message displayed to the user.

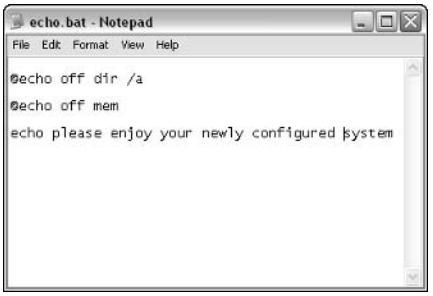

Figure 21-7: Echo command.

USING PAUSE

The pause command is used to interrupt the processing of a batch file without ending the process altogether. To use this command, simply insert the command on a line of its own in the batch file. When the pause command is encountered, the message "Press any key to continue . . ." is displayed. When the user presses a key, the batch will continue to process. So when would you use the pause command? One example would be in a script that copies some user files to a floppy disk. To ensure the user has a disk in the drive, you could use the pause command to prompt the user to insert a floppy disk. A script that pauses to prompt the user before copying a file from the hard drive to the floppy drive is shown in Figure 21-8.

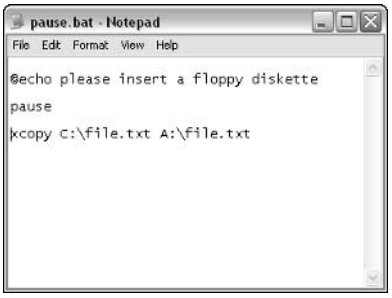

Figure 21-8: Using pause.

Batch-Compatible System Commands

This section looks at some of the commands that you can use within a batch file to actually perform complex systems functions, move data from one place to another, or connect you to resources. These commands are useful for both configuring the system at logon and performing scheduled tasks with the help of Windows XP's built-in scheduling software (Scheduled Task in the Control Panel). All of these commands have a varying number of switches you can use at runtime to specify different behaviors. Each command also has its own syntax that is expected when

the command is used. To find all of the available switches and the syntax for any command, run the command with the /? or -h option. For example, ipconfig /? will give you the relevant information for the ipconfig command.

Using Net

The **net** command allows you to do a variety of things, including the following (to name a few):

- Sharing information
- Mapping network drives
- Disconnecting previously mapped network drives
- Disconnecting remote user connections to the computer where the command is run

Commonly, the net command is used to add and remove network drive mappings. In the code sample in Figure 21-9, the net command maps a network share as a local drive (net use), then some arbitrary commands are run, and, finally, the mapped drives are dropped using the /delete option for the net use command.

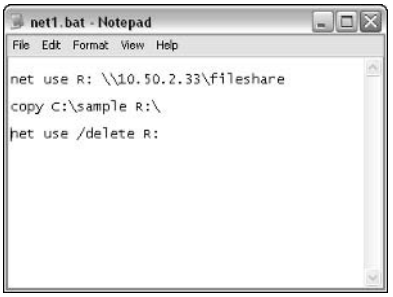

Figure 21-9: Simple net command.

This fairly simple example can be compounded in more complex scripts where you could be adding and removing drives to standardize the network drives used by a particular user or user group. By assigning the batch file in question to the person's profile, you could unmount all existing network drives and restore only the ones you want there. For example, look at Figure 21-10.

Alternatively, you can use the if command to dismount only those shares that conflict with the ones you plan to map in the batch file. The code in Figure 21-11 checks for the existence of a drive, and if it's there, the code deletes it and remaps.

This script ensures that the drive letter is mapped to the correct location (the location you choose in the script), and prevents the script from removing drive letter mappings that do not need to be deleted for your planned mappings to work.

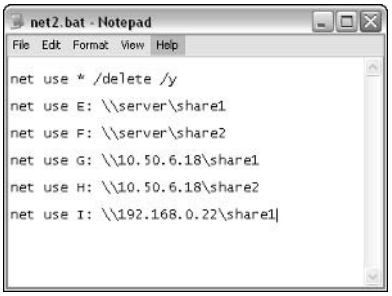
net2.bat - Notepad
File Edit Format View Help
net use * /delete /y
net use E: \\server\share1
net use F: \\server\share2
net use G: \\10.50.6.18\share1
net use H: \\10.50.6.18\share2
net use I: \\192.168.0.22\share1

Figure 21-10: Remove existing shares and remap.

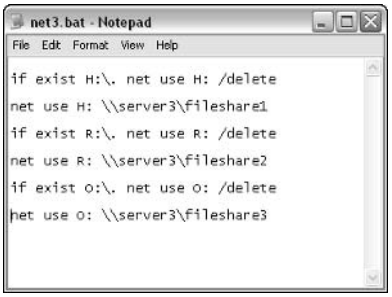
net3.bat - Notepad
File Edit Format View Help
if exist H:\. net use H: /delete
net use H: \\server3\fileshare1
if exist R:\. net use R: /delete
net use R: \\server3\fileshare2
if exist O:\. net use O: /delete
net use O: \\server3\fileshare3

Figure 21-11: Using if and net.

Using Xcopy

Xcopy is a versatile command that allows you to copy files and directories based on some very useful criteria options. Essentially, xcopy's syntax allows you to specify the location of the directory or file(s) that you want to copy and where to place the copies of those files. Something like xcopy C:\file.a F:\file.a is used to make a basic file transfer. The real power is in the options. Table 21-2 explains some of the key options available with xcopy. Like most commands, you can use xcopy /? to see a complete list of options.

TABLE 21-2 KEY XCOPY OPTIONS

Option	Example	Explanation
/C	xcopy /C C:\files*.* D:\	Continue processing if an error is encountered. This is particularly useful if you're processing a directory with lots of files. Instead of disrupting the process, your script will be able to complete.

Option	Example	Explanation
/O	xcopy /O C:\userdata E:\userbackup	This copies all of the files and transfers the file security information as well. For example, if the file is set to allow only one user write permission, that security setting will be transferred. Without this option, the security settings destination location is applied to the copied files (no changes are made to the original in either case).
/D	xcopy /D C:\userdata E:\userbackup	This option allows you to copy files based on the date they were last changed. You can specify the date in the form mm-dd-yy, or you can leave off the specification and xcopy will only copy the file if it is newer than the file at the target destination. If no file is at the destination, the file will be copied (the file is "newer than nothing").
/E	xcopy /E C:\userdata E:\userbackup	This option copies everything within the source directory including files (hidden and system files) and all subdirectories.
/Y	xcopy /o C:\userdata E:\userbackup	This option tells xcopy that if it needs to prompt the user (overwrite existing file?), it is to assume the user answers "yes."

The code sample in Figure 21-12 makes use of the previous net command example and expands on it by copying files that have a newer revision date than those at the destination (/D), copying all files and folders (/E), and continuing even if it encounters an error (/C). *.* indicates all files and folders in the location being referenced (H, in this case).

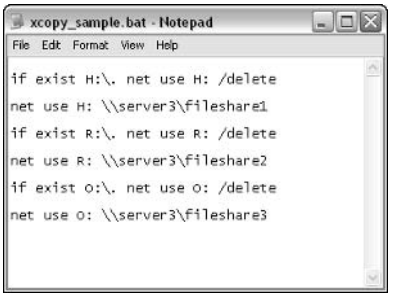
xcopy_sample.bat - Notepad
File Edit Format View Help
if exist H:\. net use H: /delete
net use H: \\server3\fileshare1
if exist R:\. net use R: /delete
net use R: \\server3\fileshare2
if exist O:\. net use O: /delete
net use O: \\server3\fileshare3

Figure 21-12: Xcopy sample.

Using Dir, CD, and Delete

Most folks who have used the command line environment in Windows for anything are familiar with the dir (directory), cd (change directory), and delete commands. The script sample in Figure 21-13 uses the same general script as with the xcopy sample, but there are some added lines to output the remote directory list to a text file (dir /a>dirlist1.txt after switching the context to the H: drive). It also creates another directory map after the file copy and then deletes the original text file (dirlist1.txt) from the remote directory.

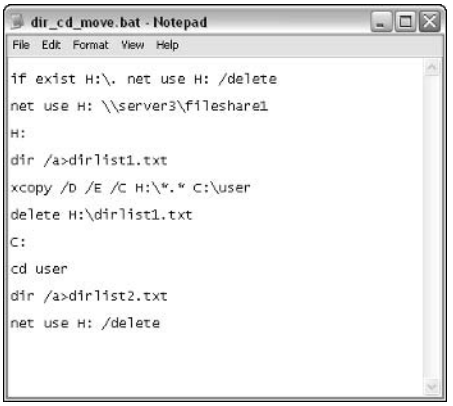

Figure 21-13: Using the dir, cd, and delete commands.

Why would you create the text files that contain the directory information and store them along with the newly copied files? One reason might be to ensure that the destination structure matches the one that was copied. Remember that the /C option makes xcopy continue on any error. If a file was locked or had security settings that prevented the user running the script from being able to read the file, the batch would still complete normally.

Using Netsh

If you need to configure a network interface from the command line, the netsh command is the best tool for the job. The netsh command can also be used to display information about the networking configuration of the target computer. The computer where you want to make the change needs to execute the netsh command locally, so using this command in a logon script can be particularly useful. At first glance, the syntax for the netsh command can be a bit overwhelming because it makes use of a dizzying array of run options. To explore these options, open a command prompt and type **netsh**. This launches the netsh command and creates a new prompt (see Figure 21-14).

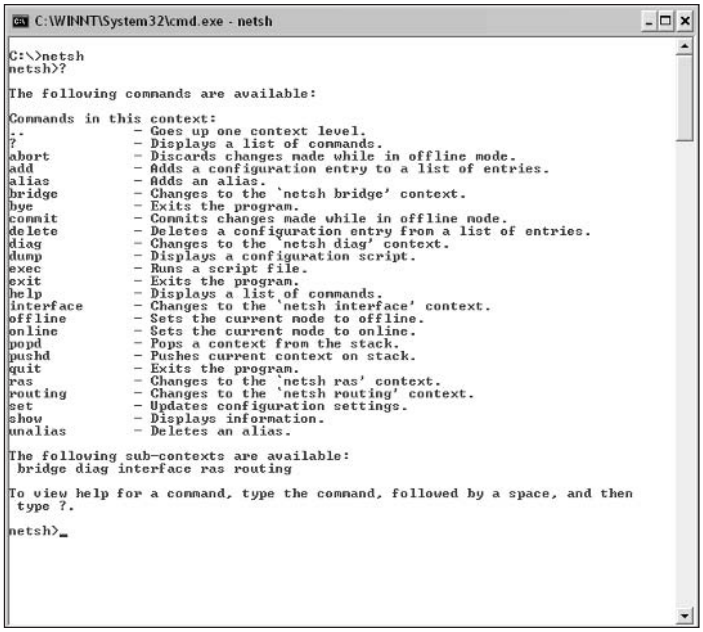

Figure 21-14: Accessing netsh help.

By entering one of the commands revealed in the preceding figure, followed by a ?, you can see the further suboptions of that netsh option. In this manner, you can drill down through the command options until you have revealed the syntax you need to perform a particular task from the command line. In the code sample that follows, the command "netsh interface ip set address local static 10.44.23.122 255.255.255.0 10.44.23.1 1" configures the local network adapter to use the IP address 10.44.23.122 with a default gateway of 10.44.23.1. Next, the script maps a network drive. If you were making use of access control lists that restrict the access to sensitive network data based on the IP address of the host connecting to the resource, this script could be useful. Of course, you'd have to be exceedingly careful with this configuration because duplicating IP addresses would be fairly easy.

```
netsh interface ip set address local static 10.44.23.122
255.255.255.0 10.44.23.1 1
net use R: \\server6\userfiles
```

A version of this script that forces hosts to use Dynamic Host Configuration Protocol (DHCP) instead of a static address might be a bit more practical. The script would ensure that all network hosts remained DHCP clients regardless of any changes the previous user made.

Gathering Information with ipconfig and netstat

Sometimes you might just want to collect information about the configuration of PCs as they are when a user logs on to the system. You might also want to collect information about the ports to which the system is currently listening, and which IP ports have users currently connected. By redirecting the output of the ipconfig and netstat commands, you can create a centralized repository of the needed information. Several options are available with each command. If you execute either command with the /? switch, you will be shown all of the available options. In the script sample in Figure 21-15, the ipconfig command sends all of the configuration output to a text file that uses the currently logged on user's name. Netstat dumps all of the current open ports and connections into a text file for review.

Figure 21-15: ipconfig and netstat scripts.

The result is that two text files containing the output of the two commands that were executed will be in a folder bearing the user's name.

Scheduling Batch Files

The Windows XP Scheduler is particularly handy if you want to automate batch file use that occurs at a time other than user logon. By scheduling the time of execution and specifying the credentials to use, you can schedule batch files to do a wealth of tasks. For example, if you make use of NT Backup to save system data, you could schedule a batch file to grab network data before the backup begins. Your script could make use of the xcopy and net commands to connect to shares (administrative or otherwise), and then copy all of the files in those mapped drives to a location on the system scheduled to have the backup performed. This way, using only Windows Backup and a batch file, you could have a networkwide backup solution. While this configuration does not scale well for large networks, it is ideal for small networks or workgroups. An example of source code that would grab network data appears in the next section.

Sample Network Backup Script

Here's a sample network backup script you can try:

```
rem Network Backup Script
rem Maps administrative shares and copies "My Documents" from each
user to a
rem corresponding folder on the system running the backup
rem This section maps administrative shares and requires the account
rem running the script to have administrative access to the target
host
net use F: \\host1\c$
net use G: \\host2\c$
net use H: \\host3\c$
net use I: \\host4\c$
rem This section begins to copy all of the files in the documents
and settings folder on
rem the target drive. Use 'xcopy /?' to see the function of each
switch used.
xcopy /c /h /o /d /e F:\docume~1 C:\host1
xcopy /c /h /o /d /e G:\docume~1 C:\host2
xcopy /c /h /o /d /e H:\docume~1 C:\host3
xcopy /c /h /o /d /e H:\docume~1 C:\host4
rem This section deletes the mapped drives since they are no longer
needed. This is
rem a security precaution.
net use /delete F:
net use /delete G:
net use /delete H:
net use /delete I:
```

This code has quite a bit going on. This is a server-side script in that it would need to run on the device that will be performing the system backup. The first section of the code uses the net command to connect to the administrative shares on a series of hosts. To make a connection to the hidden share, the target machine will need to be using Windows NT, Windows 2000, Windows XP, or Windows 2003 Server in a default configuration. You will also need to schedule the batch file to run under the credentials of a user who has administrative access to all of the target machines.

After the drives are connected, a series of xcopy commands is used to move content from the target to the backup system. The series of switches used specifies that xcopy continues in the event that it does the following:

- Encounters a fault (/C)
- Copies hidden files (/H)

- Carries the Access Control List (ACL or file security) settings (/O)
- Only moves files if they are newer than the ones on the backup system (/D)
- Copies all files and subdirectories (/E)

Finally, a series of net commands is used to disconnect the mapped drives. This step is really a tidying-up procedure that is not absolutely essential.

Appendix A

Windows XP Installation Options

IN THIS APPENDIX

- Using an attended installation
- Using an unattended installation

INSTALLING ANY OPERATING SYSTEM can be a grueling task; after all, you never know what problems you might encounter along the way. Fortunately, Windows XP is generally an easy operating system to install, but you might consider a number of different installation options, and if you are working with Windows XP in a larger network environment and have inherited the task of installing several computers, there are a few advanced setup features you might want to consider. Regardless of your needs, this appendix explores Windows XP installation and the options available to you.

Performing an Attended Installation

An attended installation of Windows XP Professional means that you will attend to the computer as installation is taking place. In this situation, you use a CD-ROM to install Windows XP, or you can install Windows XP over the network from a network share. In either case, you physically run the installation and answer installation prompts as they occur.

As with previous versions of Windows, particularly Windows 2000 Professional, the key to a successful Windows XP Professional installation is careful planning before the installation takes place. Through proper planning, you can avoid problems before they occur, and you can make sure your computer and applications are ready to meet the demands of Windows XP Professional. Armed with the correct information, installation is typically anticlimactic because you solve potential problems before they occur. In the following sections, you'll explore the important planning steps you should take before installing Windows XP Professional.

Minimum Hardware Requirements

Like all operating systems, Windows XP has certain hardware requirements that must be met before it can be installed, or at least hope for it to perform in a satisfactory manner. Before installing Windows XP Professional, check out the computer's hardware and make sure it is powerful enough to handle the demands of Windows XP. Table A-1 gives you the minimum hardware requirements as well as the recommended hardware requirements for Windows XP. As you might expect, the base, or minimum, hardware requirements are just that — what you need to install Windows XP Professional for it to actually run. However, if you want good performance from the machine, you should meet the recommended hardware requirements and, preferably, exceed them.

TABLE A-1 MINIMUM HARDWARE REQUIREMENTS

Component	Minimum Requirement	Recommended Requirement
Processor	233-MHz Pentium	300 MHz or higher — the faster the processor, the better performance you are likely to see
RAM	64 MB	128+ MB recommended — 4 GB maximum
Hard Disk Space	1.5 GB free disk space	4+ GB
Monitor	VGA Monitor	VGA Monitor
Mouse	Windows compatible	Windows compatible
CD-ROM	Windows compatible CD or DVD-ROM drive	Windows compatible CD or DVD-ROM drive
Network Card	Compatible network card and cable if over-the-network installation is desired	Compatible network card and cable if over-the-network installation is desired

During the setup routine, Windows XP Professional will check the computer's hardware and software applications to determine if there are incompatibilities. However, your best bet is to check these items first so that problems can be avoided during installation. You should also take inventory of the computer's hardware, such as the sound card, video card, modem, and related components, and check the Windows XP Hardware Compatibility List (HCL) found at `www.microsoft.com/hcl`. Some devices might not appear on the HCL; however, this does not mean that the hardware will not work — Microsoft just hasn't tested it. If you have questionable

hardware, check the hardware manufacturer's Web site for more information and possible driver updates or upgrade packs. You should acquire the new drivers or updates before starting the installation of Windows XP Professional.

If you are installing Windows XP Professional on a computer that has no existing operating system, and XP is the only operating system you want to use, there is nothing you need to do. The setup routine will format the drive for you and allow you to choose a file system of choice (FAT32 or NTFS). Windows XP is optimized for the NTFS file system, which provides file-level security and a host of additional security features that are not available under FAT or FAT32.

If an operating system currently exists on your computer, Windows XP can either upgrade the existing operating system, install a clean copy of Windows XP (which essentially erases the previous operating system and data), or you can install Windows XP Professional in a separate partition for a dual-boot scenario. A dual-boot scenario enables you to boot more than one operating system on the same computer. For example, you could have a system that will boot Windows 2000 Server and Windows XP Professional, or a system that will boot Windows Me or Windows XP Professional. Each operating system resides in its own partition, and during boot, you are given a boot menu so that you can choose which operating system you want to boot. Across the board, dual-boot configurations are easy to configure, but keep in mind that only Windows XP, Windows 2000, and Windows NT 4.0 can read NTFS partitions. Windows 9x, Me, and 95 can only read FAT or FAT32 drives. So, if you want the downlevel operating system to read the Windows XP partition, you'll need to use FAT32 as the file system instead of NTFS.

Getting Ready for an Upgrade

When you upgrade an operating system, you keep all of your existing files and settings, which are then moved to the new operating system when it is installed. When you begin the installation of Windows XP, the setup routine detects any previous versions of Windows that may be present; depending on the version, Windows XP can either upgrade the existing operating system or it can install a clean copy of Windows XP. When you upgrade, Windows XP installs in the same folder as the previous operating system, upgrading files and drivers, as needed. Your existing applications and settings are preserved. When you clean install, Windows XP installs in a different folder. After installation is complete, you must reinstall any applications that you want to use. As a general rule, upgrading to Windows XP is very easy and straightforward, but make certain you adhere to the guidelines explored in the following sections.

If you are upgrading a previous operating system, such as Windows 2000, make sure you have the latest service pack installed before you start the upgrade. This action will help reduce the likelihood of installation problems. See Microsoft.com to find out more about available service packs.

Upgrade Compatibility

All hardware requirements still apply in an upgrade scenario, so it is important to check out the computer's hardware before starting an upgrade. Also, spend a few moments checking out the applications you are installing to see if they are compatible with Windows XP. You can check the software vendors' Web sites for upgrade information.

Windows XP Professional can directly upgrade the following operating systems:

- All versions of Windows 98
- Windows Me
- Windows NT 4.0 Workstation (with service pack 6 or later)
- Windows 2000 Professional
- Windows XP Home edition

Notice that Windows 95 did not make the list, nor did any previous versions of Windows NT. If you want to upgrade these operating systems, your only choice is to either choose a clean install (in which case you lose all of your applications and settings), or to upgrade the unsupported operating system to a supported version, then upgrade to Windows XP. For example, you could upgrade Windows 95 to Windows 98, and then to Windows XP.

Application Compatibility

Before upgrading to Windows XP Professional, take a look at the applications that you want to use with the operating system. If you are moving from some earlier version of Windows, such as Windows 98, you may have applications that are incompatible with Windows XP. If you are moving from Windows 2000, you are not likely to experience any problems.

Finally, you need to remove any software that may interfere with installation. You should remove any antivirus programs. Setup needs full access to your computer's hard drive and antivirus programs may interfere. Also, you cannot install Windows XP Professional on any drives that are compressed. Decompress affected drives before running the installation. Finally, remove any disk management software, as these programs can interfere with installation.

Installing Windows XP Professional

Windows XP Professional can be installed as an attended installation using the installation CD-ROM or over the network from a network share. In many network environments, the network installation option is often used to make installations easier and provide one central location for the installation files. The following sections explore both types of installations.

Create a Backup

The smartest action you can take before installing Windows XP Professional as an upgrade is to back up the previous operating system and all of your data. In the event that something goes wrong during installation, you can always recover from backup. Of course, if you are installing a clean copy of Windows XP Professional or installing XP on a new computer with no operating system, a backup is unnecessary. In an upgrade scenario, however, it is very important to protect your data by backing it up. Depending on the operating system you are currently using, your backup options may vary, and you can even use third-party backup tools, so you'll need to check your current operating system for backup instructions.

Installing from a CD-ROM

The Windows XP installation CD is bootable, and you can start installation by booting from the CD if your computer supports CD booting. In an upgrade or clean install scenario, just insert the CD-ROM while you are booted into your current operating system and follow the setup instructions. If your computer has no operating system and your CD-ROM drive is not bootable, you'll need to boot into DOS using a startup disk (or even a Windows 98 startup disk). You can then start the installation by accessing your CD-ROM drive and running setup.exe.

At the Welcome to Microsoft Windows XP screen, you can launch setup or you can have setup check your system for compatibility. Setup is rather straightforward, and the following steps will guide you:

1. Launch the CD-ROM or setup.exe, as necessary, for your particular installation.
2. Setup begins and collects information about your computer. In the Welcome to Windows Setup screen, shown in Figure A-1, you can use the drop-down menu to select New Installation or Upgrade. Make your decision and click Next.
3. The Licensing Agreement window appears. Read the agreement, click the I Accept this Agreement radio button, and click Next.
4. The product key window appears. Enter the 25-character product key that is found on the yellow sticker on the back of your CD case. Enter the key, and click Next.
5. The Setup Options window appears, as shown in Figure A-2, if you selected the Clean Install option in Step 2. At this point, you can change the Accessibility Options and language, if desired, and you can also click the Advanced Options button.

Windows Setup
Welcome to Windows Setup
Which type of installation do you want to perform?
Installation Type:
New Installation (Advanced)
Choose this option to replace Windows or to install Windows on a separate disk or partition.
IMPORTANT: Existing files may be lost. If you are unsure how to proceed, choose the Upgrade option (if available).
During Setup, it is normal for your screen to go blank for a few seconds and for the computer to restart itself several times.
< Back
Next >
Cancel

Figure A-1: Select the kind of installation you want.

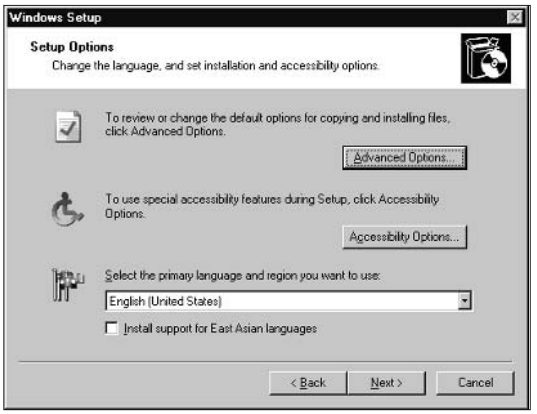
Windows Setup
Setup Options
Change the language, and set installation and accessibility options.
To review or change the default options for copying and installing files, click Advanced Options.
Advanced Options...
To use special accessibility features during Setup, click Accessibility Options.
Accessibility Options...
Select the primary language and region you want to use:
English (United States)
Install support for East Asian languages
< Back
Next >
Cancel

Figure A-2: Setup Options.

6. In the Advanced Options window, shown in Figure A-3, you have the following options:

   - **Installation file copy** – You can specify the location from which the setup files should be copied. This feature can be useful if you need to start setup from a CD, but actually want the files copied from another location.
   - **Folder location** – You can specify the folder name to which the files should be copied. \Windows is the default and typically what you should use.
   - **Copy all installation files from the Setup CD** – Use this option to copy all files to the computer's hard drive before beginning installation. This feature can be helpful if you need to install several computers but only have one CD. You can copy the files and continue with installation without the CD-ROM so that it can be used on another machine.

- **I want to choose the install drive letter and partition during Setup** – This option allows you to choose the install drive letter and partition.

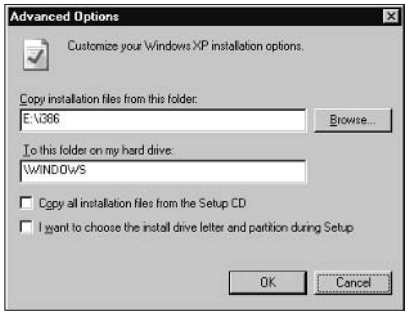
Advanced Options
Customize your Windows XP installation options.
Copy installation files from this folder:
E:\I386
Browse...
To this folder on my hard drive:
\WINDOWS
Copy all installation files from the Setup CD
I want to choose the install drive letter and partition during Setup
OK
Cancel

Figure A-3: Advanced Options.

Make any desired selections, click OK, and then click Next.

7. The Setup Files window appears. You can choose to connect to the Internet and check for updated files that can be downloaded and used during the installation. Your current operating system must be configured with an Internet connection for this option to work, but if you have a connection, you should use the option. Choose either Yes or No and click Next.
8. At this point, the file copy process begins. Setup copies the necessary files to your computer's hard drive, and then automatically reboots your computer (make sure there is no floppy disk in the disk drive).
9. After the computer reboots, the MS-DOS portion of setup begins. The Setup Notification window appears. Press Enter to Continue.
10. In the Welcome to Setup window, you can choose to install Windows XP Professional now by pressing Enter, repair an existing installation by pressing R, or quit setup by pressing F3. Press Enter to continue with Setup.
11. Depending on your upgrade or clean install choices, you may see a partition window where you can choose the desired partition in which you want to install Windows XP Professional and format that partition, as well. Follow the setups that appear to select a desired partition, create a partition from unpartitioned space, and to format that partition.
12. After the partition is established and formatted with a file system, the file copy process begins. This may take some time and requires no intervention from you.
13. After the file copy process is complete, the computer automatically reboots. At this point, you see the Windows XP setup screen and installation continues. The approximate amount of time that setup will require is

also displayed here. It is not unusual for the screen to flicker several times during this phase of setup.

14. During the installation of Windows XP Professional, the Regional and Language Options window appears. You can click the Customize button to choose a different language or region, or you can click the Details button to view information about your current regional configuration. Click Next to continue.
15. In the Personalize Your Software window, enter your name and organization. Click Next.
16. In the Computer Name and Administrator password window, enter a name for the computer (or accept the default) and an administrator password. The password will be used in conjunction with the Windows XP Professional administrator account and should be kept private. Typically, for the best security, the local administrator password should be at least seven characters long and should contain both letters and numbers.
17. In the Modem Dialing information window, choose your country and enter your area code and outside line number (if necessary). This window does not appear if you do not have a modem attached to your computer. Click Next.
18. In the Date and Time Settings window, use the drop-down menus to choose the correct time, date, and time zone. Click Next.
19. Setup continues and a Networking Settings window appears if a network adapter card is installed on the computer. You can choose Typical Settings, which installs TCP/IP, Client for Microsoft Networks, and File and Printer Sharing for Microsoft Networks. If you want to select the services and IP address you will configure, choose the Custom Settings option and click Next to complete the information.
20. The Choose Workgroup or Computer Domain window appears. Choose a desired work or domain name and click Next. If you are creating a new workgroup, enter the desired name in the provided dialog box.
21. Setup continues and may require another 30 minutes or longer before the computer reboots.
22. After the computer reboots, Windows XP Professional boots for the first time.

Once setup completes, a few questions appear, such as the configuration of an Internet connection, the user's name, registration, and so on. The user can also choose to activate Windows XP Professional if an Internet connection exists. See *Activating Windows XP* later in this chapter for more information about activation of the software.

Installing from a Network Share

Rather than using a Windows XP CD-ROM for an attended installation, you can connect to a network share and begin setup over the network. This feature is often used to install a group of computers at the same time so that you do not have to wait for an installation CD to become available. The actual installation steps and procedures remain the same when installing over a network share, but you start the installation by connecting to the network and share launching setup.exe.

To install Windows XP Professional over the network, you must first set up a server that will function as a distribution server. This server holds a shared folder that contains all of the contents of the Windows XP Professional installation CD-ROM. In actuality, the distribution server can be any computer on the network that can share files and folders. To use a distribution server, create a shared folder on the desired computer, and then copy the contents from the Windows XP installation CD-ROM to this folder. For client computers to access the shared folder, the client computer must be configured with a network card and connection cabling. In most cases, the use of a distribution server is helpful for upgrades, where IT support personnel or even end users themselves use the existing operating system to connect to the shared folder and begin installation. If a computer has no current operating system, you would need a network boot disk to install Windows XP in this manner.

To begin the installation, the client computer simply connects to the distribution server's shared folder and launches setup.exe. For example, if the distribution server's name is Server1 and the shared folder's name is XP, you can start the installation by connecting to \\Server1\XP\setup.exe. When setup.exe is launched, the files are copied from the distribution server to the client computer, and installation proceeds as it typically would.

Using Winnt32.exe

Winnt32.exe is a setup program used to start a Windows XP installation using a variety of setup switches. Windows XP Professional, like previous versions of Windows, supports Winnt32.exe, and you can use this program for an upgrade of supported versions of Windows. Using the provided setup switches, you can make the installation of Windows XP easier by invoking different needs or setup options automatically. Also, if you want to use an unattended installation of Windows XP Professional, you can start the unattended installation using Winnt32.exe. Table A-2 provides an explanation of the available command line switches appearing in the following Winnt32.exe syntax.

```
winnt32 [/checkupgradeonly] [/cmd:command_line] [/cmdcons]
[/copydir:i386\folder_name] [/copysource:folder_name]
[/debug[level]:[filename]] [/dudisable] [/duprepare:pathname]
[/dushare:pathname] [/m:folder_name] [/makelocalsource] [/noreboot]
[/s:sourcepath] [/syspart:drive_letter] [/tempdrive:drive_letter]
[/udf:id [,UDB_file]][/unattend[num]:[answer_file]]
```

TABLE A-2 AVAILABLE COMMAND LINE SWITCHES

Switch	Explanation
/checkupgradeonly	Checks your computer for upgrade compatibility with Windows XP. If you use this option with /unattend, no user input is required. Otherwise, the results are displayed on the screen, and you can save them under the filename you specify. The default filename is Upgrade.txt in the systemroot folder.
/cmd:command_line	Tells Setup to carry out a specific command before the final phase of Setup. This occurs after your computer has restarted and after Setup has collected the necessary configuration information, but before Setup is complete.
/cmdcons	Installs the Recovery Console as a startup option on a functioning computer. You can only use the /cmdcons option after normal Setup is finished.
/copydir:i386\ folder_name	Creates an additional folder within the folder in which the Windows XP files are installed. You can use /copydir to create as many additional folders as you want.
/copysource: folder_name	Creates a temporary additional folder within the folder in which the Windows XP files are installed. You can use /copysource to create as many additional folders as you want, but the folders /copydir creates, /copysource folders are deleted after Setup completes.
/debug[level]: [filename]	Creates a debug log at the level specified, for example, /debug4:Debug.log. The default log file is C:\systemroot\ Winnt32.log, and the default debug level is 2. The log levels are as follows: 0 represents severe errors, 1 represents errors, 2 represents warnings, 3 represents information, and 4 represents detailed information for debugging. Each level includes the levels below it.
/dudisable	Stops Dynamic Update from running. This option will disable Dynamic Update even if you use an answer file and specify Dynamic Update options in that file.
/duprepare:pathname	Carries out preparations on an installation share so that it can be used with Dynamic Update files that you downloaded from the Windows Update Web site. This share can then be used for installing Windows XP on multiple clients.
/dushare:pathname	Specifies a share on which you previously downloaded Dynamic Update from the Windows Update Web site, and on which you previously ran /duprepare:pathname. When run on a client, specifies that the client installation will make use of the updated files on the share specified in the pathname.

Switch	Explanation
/m:folder_name	Specifies that Setup copies replacement files from an alternate location. Instructs Setup to look in the alternate location first, and if files are present, to use them instead of the files from the default location.
/makelocalsource	Tells Setup to copy all installation source files to the local hard disk. Use /makelocalsource when installing from a CD to provide installation files when the CD is not available later in the installation.
/noreboot	Instructs Setup not to restart the computer after the file copy phase of Setup is completed so that you can execute another command.
/s:sourcepath	Specifies the source location of the Windows XP files. To simultaneously copy files from multiple servers, type the /s:sourcepath option multiple times (up to a maximum of eight). If you type the option multiple times, the first server specified must be available, or Setup will fail.
/syspart:drive_letter	Specifies that you can copy Setup startup files to a hard disk, mark the disk as active, and then install the disk into another computer. When you start that computer, it automatically starts with the next phase of Setup. You must always use the /tempdrive parameter with the /syspart parameter.
/tempdrive:drive_letter	Directs Setup to place temporary files on the specified partition. For a new installation, Windows XP will also be installed on the specified partition. For an upgrade, the /tempdrive option affects the placement of temporary files only; the operating system will be upgraded in the partition from which you run winnt32.
/udf:id [,UDB_file]	Uses an identifier (id) that Setup uses to specify how a Uniqueness Database (UDB) file modifies an answer file (see the /unattend entry).
/unattend	Runs an upgrade using the previous operating system (if supported). All user settings are taken from the previous installation, so no user intervention is required during Setup.
/unattend[num]: [answer_file]	Performs a fresh installation in unattended Setup mode. The specified answer_file provides Setup with your custom specifications. (Num is the number of seconds between the time that Setup finishes copying the files and when it restarts your computer. You can use num on any computer running Windows 98, Windows Me, Windows NT, Windows 2000, or Windows XP.)

Activating Windows XP

Windows XP Home and Professional versions use a new feature from Microsoft called Product Activation. Due to software piracy, product activation is now used to enforce the end user license agreement where one copy of Windows XP can be installed on one computer only. This feature prevents the copying of installation CDs, otherwise known as softlifting.

During installation, the product key found on the back of the CD-ROM case is combined with a generated hardware identifier number, taken from information about the computer system on which the software is being installed. Taken together, the two numbers create a unique installation ID that is uploaded to Microsoft servers via the Internet, or manually through a call to Microsoft customer support. Once the product is activated, the CD cannot be used to install another computer with Windows XP Professional, which enforces the end user license agreement of one CD per computer. In large environments where large numbers of computers are configured with Windows XP Professional, activation may work differently or not be necessary at all, depending on the licensing agreement between the corporation and Microsoft.

In a typical activation scenario, you are prompted to activate Windows XP after an installation completes, if a modem is detected on the computer. If one is not detected or a connection cannot be made, you will be prompted to contact Microsoft to manually activate the product. You can skip over this step and activate Windows at a later time because you are given a 30-day grace period in which to activate it. If Windows XP is not activated immediately after Setup, an activation icon appears in the Notification Area which you can click to start the activation process, or simply click Start → All Programs → Activate Windows.

Moving Files and Settings to Windows XP

One of the big problems with a new computer system is migrating documents and settings to that new computer. As PC upgrades and changes have become more common in the ever-growing hardware market, this problem has only grown—even at the home user level. Windows XP Professional answers this question by providing a new File and Settings Transfer Wizard.

The File and Settings Transfer Wizard enables you to copy files and settings from a previous version of Windows where they are saved on some kind of removable media or network connection and then transferred to a new computer. Keep in mind that this feature works for moving data from one computer to another and is not necessary when upgrading the operating system on the same computer. For example, say I have an old Windows 98 computer and I purchase a new computer with Windows XP. I can use the File and Settings Transfer Wizard to move all of my information and settings to the new computer quickly and easily. You can transfer files and settings from any version of Windows 95, Windows 98, Windows Me, Windows NT 4.0, Windows 2000, or Windows XP (32-bit only).

The File and Settings Transfer Wizard can transfer settings from the following:

- Accessibility
- Command prompt settings
- Display properties
- Internet Explorer settings
- Microsoft Messenger settings
- NetMeeting settings
- Mouse and keyboard settings
- MSN Explorer
- Network printers and drivers
- Outlook Express
- Regional settings
- Sounds and multimedia
- Taskbar options
- Windows Media Player
- Windows Movie Maker

You may also be able to transfer settings from other software, such as Microsoft Outlook. The wizard can also transfer specific folders, such as the following:

- Desktop
- Fonts
- My Documents
- My Pictures
- Shared Desktop
- Shared Documents

Additionally, the wizard can transfer most multimedia files not found in these folders.

To transfer settings from an older version of Windows, you can use the Windows XP installation CD, and then follow these steps:

1. On the downlevel computer, insert the Windows XP Professional CD-ROM. At the Windows XP startup screen, click Perform Additional Tasks, and then click Transfer Files and Settings.

2. The File and Settings Transfer Wizard appears. Click Next.
3. The system is scanned and the Select a method of transfer window appears. You can choose to use a direct cable connection, network connection, removable media connection, or another type of connection (such as saving the settings to a disk drive or a network folder). Make your selection and click Next.
4. In the What do you want to transfer window, you can choose to transfer settings only, files only, or both. You can click the Let me choose check box to specifically select what you want to transfer. Make your selection and click Next.
5. If you choose the Let me choose check box option in Step 4, the custom window appears. From this window, you can add or remove settings and files, file types, and folders, as desired. When you are done, click Next.
6. The wizard collects the data that you specified. This may take some time depending on how much information you want to transfer. When the wizard is done, click Finish.

After you have completed the collection portion of the File and Settings Transfer Wizard, you can run the wizard on your Windows XP computer so that the settings can be migrated and configured. Once again, the File and Settings Transfer Wizard walks you through this process. Just follow these steps:

1. Click Start → All Programs → Accessories → System Tools → Files and Settings Transfer Wizard.
2. Click Next on the Welcome screen.
3. On the Which computer is this? screen, click the New Computer radio button and click Next.
4. The wizard then provides you with a screen asking if you have a Windows XP CD and telling you that you need to run the wizard on the old computer. Notice here that the wizard can create a wizard disk for you if you are missing the CD-ROM. Because you have already collected your settings in the previous exercise, click the I don't need the wizard disk radio button option, and then click Next.
5. Choose where the files should be collected (direct cable connection, removable media, network folder, and so on). Make your selection and click Next.
6. The wizard locates the files and transfers them to the new computer. Click Finish. You will be prompted to log off and log back on for the settings to take effect.

Running an Unattended Installation

Windows XP Professional contains a program called Setup Manager that can help you generate answer files for a Windows XP Professional unattended installation. Before getting into answer file creation, let's back up a bit and talk about unattended installations and answer files. In an unattended installation, you typically start Setup using Winnt32.exe, using an unattended switch and pointing to an answer file.

An answer file is simply a text file that Setup can read to find the answers to Setup prompts. For example, Setup always asks if you want to check for Dynamic Updates on the Web. Using the answer file, you can answer the question one time; Setup reads the file, and no input is required directly from you. The advantages are obvious—you can start the installation routine on several or even hundreds of computers without having to sit through the installation.

You can find a sample of an answer file in the I386 folder on your Windows XP Professional CD-ROM. The file is called Unattend.txt, and as you can see in Figure A-4, the file is a simple text file that you can read. In the past, answer files were somewhat difficult because you had to write them from scratch. With Setup Manager, a wizard guides you through the process and helps you create the answer file, which makes unattended Setups a lot easier.

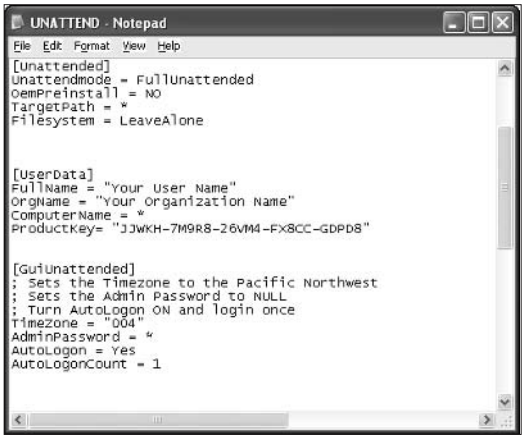

Figure A-4: Unattend.txt.

Setup Manager is located on your Windows XP Professional installation CD-ROM in the Deploy.cab folder. You have to extract this folder to use the Setup Manager tool so you can create an answer file. The following steps show you how to extract the Deploy.cab folder.

1. On the desired computer, log on as the administrator and create a folder in which to place the deployment tools and name the folder, as desired.
2. Insert the Windows XP Professional installation CD-ROM. Close the installation window that appears.
3. Open My Computer, right-click the CD-ROM drive, and click Explore.
4. Open the Support folder, and then open the Tools folder. You'll see the Deploy.cab file, as shown in Figure A-5.

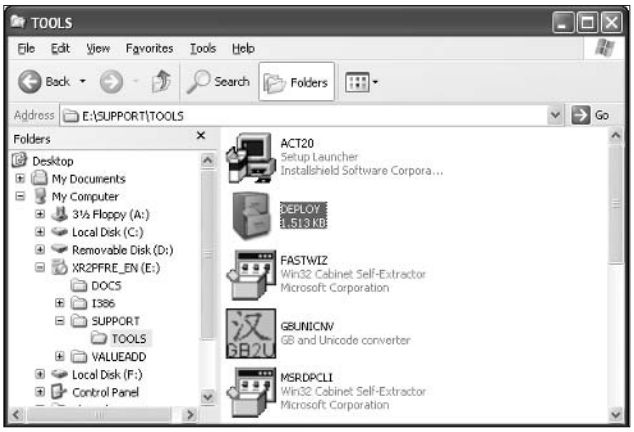

Figure A-5: Deploy.cab.

5. Double-click the Deploy.cab file to open it. You'll see several different tools appear, including Setup Manager (setupmgr).
6. Click Edit → Select All, and then right-click the files and click Extract.
7. In the Select a Destination dialog box that appears, browse for the folder you created, select it, and then click the Extract button. The tools are copied from the CD-ROM to the desired folder.

Now that the Deployment tools have been copied to the desired computer, you can create an answer file to use for an unattended installation. Remember that an answer file simply answers the questions that the Setup routine typically poses to you during an attended Setup. With this automated method, an IT technician can start an installation and not have to wait for each prompt the Setup routine poses. Instead, the answer file contains the answers that you want provided, and it can even provide Setup with information about hardware, such as sound cards, modems, and so on.

Of course, the Windows XP Professional CD-ROM gives you unattend.txt, which you can use for unattended installations. This text file provides basic Setup options, but you may need to customize your own Setup file. Using Setup Manager, you can easily create this file, and the following steps show you how:

1. Launch the setupmgr program in your deployment folder.
2. Click Next on the Welcome screen.
3. In the New or Existing Answer File window, shown in Figure A-6, you can choose to create a new answer file, or you can modify an existing answer file by selecting the option and browsing for the file. For this exercise, we are going to create a new answer file. Click the radio button option and click Next.

Windows Setup Manager Wizard
New or Existing Answer File
An answer file tells Setup how to install and configure Windows.
Do you want to create a new answer file or modify an existing one?
Create a new answer file
Modify an existing answer file
Enter the path and file name of the answer file:
Browse...
< Back
Next >
Cancel
Help

Figure A-6: Create a new file.

4. In the Product to Install window, shown in Figure A-7, you can create the answer file for a Windows Unattended Installation, Sysprep Install, or Remote Installation Services installation. Here, we are creating an answer file for a Windows Unattended Installation (the other two are advanced options that require Windows server configuration). Select the unattended option and click Next.
5. In the select the platform that this file installs, choose the Windows XP Professional radio button and click Next.
6. The User Interaction Level window appears, as shown in Figure A-8. You have five different options:
   - **Provide defaults** – This option provides an unattended Setup where the answers you are provided are considered the defaults. When the installation is run, the user can see the answer defaults and interrupt Setup to change them if desired. As you can see, this option is not fully automated, but it does provide the answers up-front for review.
   - **Fully automated** – Using this method, the user is never prompted to answer any questions. All answers are taken from the answer file and the user cannot interrupt Setup or change any of the options.

- **Hide Pages** – If you provide all of the answers for the Windows Setup Wizard page, the wizard page is hidden from the user.
- **Read Only** – If the Windows Setup Wizard page is not hidden from the user, you can use this option so that the page is read only. The user can make no changes to the Setup wizard.
- **GUI Attended** – Only the text-mode portion of Windows Setup is automated.

Figure A-7: Unattended installation option.

Make your selections based on the level of user input and/or automation that you want and click Next.

Windows Setup Manager Wizard
User Interaction Level
Do you want users to provide information during Windows Setup?
Select the level of user interaction during Windows Setup:
Provide defaults
Fully automated
Hide pages
Read only
GUI attended
Description
Windows Setup does not prompt the user for any answers. You supply all required answers in the answer file.
< Back
Next >
Cancel
Help

Figure A-8: User Interaction Level window.

7. The Distribution folder window appears. When using an answer file, you can choose to install Windows XP Professional from the CD, or from a distribution folder. A network distribution folder holds the Windows XP Professional installation files so you can connect to this folder over the network. In conjunction with an answer file, you can roll out any number of installations at one time. Choose the desired radio button and, for this exercise, create a distribution folder. Click Next.
8. If you choose to create a distribution folder, you can copy the files from a CD or from another location. Make your selection and click Next.
9. In the Distribution Folder Name window, you can choose to create a new distribution folder or modify an existing one. If you choose to create a new distribution folder, select the location and the share name for the folder, and then click Next.
10. The License Agreement window appears. Read the basic End User License Agreement (EULA) and click the I Accept check box. Click Next.
11. The Customize window appears. At this point, you can click through each setting in the left window and enter your answer in the right pane. Setup will use the answers provided here to configure the answer file, which automates Setup. Simply respond to the answer prompts and click Next through the entire list of settings.
12. After you answer the final prompt, a dialog box appears telling you that Setup Manager has successfully created an answer file and prompting you for the location to which to save the file. Choose the desired location and click OK. Click Finish when prompted.

After the answer file is created, you can begin running unattended Setups with the answer file. Once you are ready to run Setup, you can use Winnt32 to begin the unattended installation of Windows XP Professional. The syntax for running the unattended Setup is as follows:

```
Winnt32 /s: d:\i386 /u:c:\unattend\unattend.txt
```

Where:

- **/s: d:\i386** – Specifies the location of the Windows XP Professional installation files – this can be your I386 folder on the CD-ROM or a network distribution folder.
- **/u:c:\unattend\unattend.txt** – Specifies that this is an unattended installation and the answer file is unattend.txt and is located in the Unattend folder on the C: drive. Of course, your location will probably be different, so just enter the correct UNC path to the answer file.

Common Troubleshooting Issues

No installation is foolproof, and problems can occur when you install Windows XP. Typically, if you follow the hardware guidelines and setup procedures, you are unlikely to experience installation problems, but you should be aware of the potential problems and troubleshooting areas you should examine.

In a typical Windows XP Professional installation scenario, the most common causes of installation problems or failure are as follows:

- Hardware is incompatible or hardware does not meet the minimum hardware requirements. Typically, Windows XP will tell you if the hardware in the PC is incompatible or does not meet minimum standards; however, in a failed installation, you should always start here and make sure there are no compatibility problems.
- Some CD-ROM drives, particularly older drives, might not work well with Windows XP. Make sure the CD-ROM drive is compatible. Also, make sure you do not have a faulty CD.
- During hardware detection and driver installation, your computer can lock up. Although this typically does not happen with Windows XP, you can simply restart the computer, and installation should continue where it left off.
- Make sure your video card is up-to-date and is supported by Windows XP Professional. Installation problems can occur due to faulty video cards.

If you are having extensive problems with Setup and you have checked the preceding points, you can also access a Setup log to determine what problems may have occurred. This assumes that you can get the operating system actually installed. The log is called setupact.txt and is located in C:\Winnt (if you installed in a different drive, just substitute the correct drive letter for C:).

Appendix B

Using the Command Console

IN THIS APPENDIX

- Understanding the command console
- Using the command console

THE COMMAND CONSOLE IS certainly still available in Windows XP and ready for your use. In the past, the command console was the main interface of most computing systems. Today, of course, the need for the command console has diminished as graphical interfaces do more and quickly provide the configuration and access options you need. However, many tasks can still be accomplished more quickly and easily using the command console, and this appendix gives you a quick overview of the console and the commands you might want to use from time to time.

Getting to Know the Command Console

The Windows XP command console, cmd.exe, is the one you should use for all of your command line activities. If you are wondering what happened to Command.com from earlier Windows days, it is still around and supported in Windows XP for backwards compatibility with older applications that need Command.com. However, cmd.exe is a 32-bit version of the command console, and it allows you to do things that Command.com cannot do, such as run external MS-DOS commands, batch files, and support other commands that Command.com does not support. So, the quick lesson here is to always use cmd.exe, unless you have a specific reason for using Command.com.

You can open cmd.exe easily by clicking Start → Run and typing **cmd** at the Run line, then press Enter. The command console (shown in Figure B-1) appears, showing your logon name. The prompt is now ready to receive commands. You can type **help** to get a listing of commands (which are also listed later in this appendix), or **exit** to leave the command console. You can also click the X in the upper-right corner to exit.

Figure B-1: The command console.

One important note here is the color and style of the command console, which gives you a black background and white lettering by default. You can right-click the command console title bar and click Properties to open a Properties dialog box. On the Options tab, you can manage the cursor size and display options, along with command history and edit options. On the Font tab, you can change the font used for the command console, which can be helpful if the default font is difficult to read. On the Layout tab, you can change the screen buffer size, window size, and window position for further customization. On the Colors tab, shown in Figure B-2, you can determine what colors are used on the text and background. As you can see, these options are easy to change and can make the command console easier for you to use.

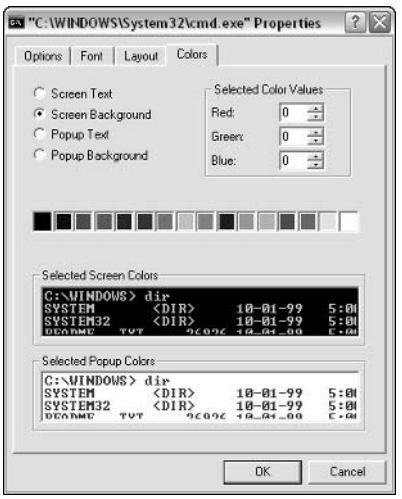

Figure B-2: You can manage the appearance of the command console.

Syntax

The common command console syntax you can use with commands provides you with a few different options for using the command console and getting the results you want. Keep in mind that each command may contain additional parameters you can use, which you can find by typing the command with a **/?** at the command line. For example, you can type **start /?** at the command line to see all of the parameters for the start command, as you can see in Figure B-3.

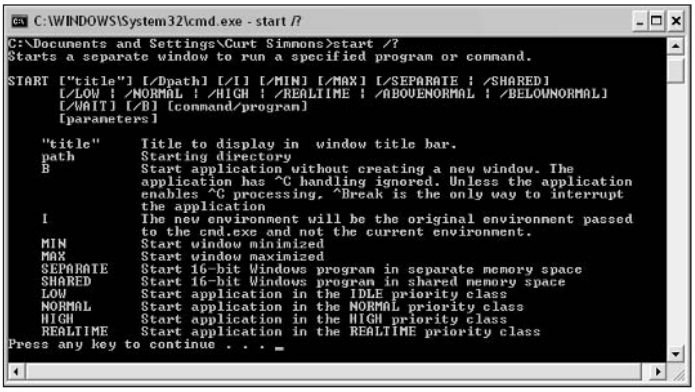
C:\WINDOWS\System32\cmd.exe - start /?
C:\Documents and Settings\Curt Simmons>start /?
Starts a separate window to run a specified program or command.
START ["title"] [/Dpath] [/I] [/MIN] [/MAX] [/SEPARATE | /SHARED]
[/LOW | /NORMAL | /HIGH | /REALTIME | /ABOVENORMAL | /BELOWNORMAL]
[/WAIT] [/B] [command/program]
[parameters]
"title" Title to display in window title bar.
path Starting directory
B Start application without creating a new window. The
application has ^C handling ignored. Unless the application
enables ^C processing, ^Break is the only way to interrupt
the application
I The new environment will be the original environment passed
to the cmd.exe and not the current environment.
MIN Start window minimized
MAX Start window maximized
SEPARATE Start 16-bit Windows program in separate memory space
SHARED Start 16-bit Windows program in shared memory space
LOW Start application in the IDLE priority class
NORMAL Start application in the NORMAL priority class
HIGH Start application in the HIGH priority class
REALTIME Start application in the REALTIME priority class
Press any key to continue . . .

Figure B-3: Find the parameters for any command using the /? option.

Otherwise, you can use the following parameters for cmd:

```
cmd [[{/c|/k}] [/s] [/q] [/d] [{/a|/u}] [/t:fg] [/e:{on|off}]
[/f:{on|off}] [/v:{on|off}] string]
```

- **/c** – Carries out the command specified by *string* and then stops.
- **/k** – Carries out the command specified by *string* and continues.
- **/s** – Modifies the treatment of *string* after /c or /k.
- **/q** – Turns the echo off.
- **/d** – Disables the execution of AutoRun commands.
- **/a** – Creates American National Standards Institute (ANSI) output.
- **/u** – Creates Unicode output.

- **/t:***fg* – Sets the foreground (*f*) and background (*g*) colors. You have the following values you can use for *f* and *g*.
  - 0 = Black
  - 1= Blue
  - 2 = Green
  - 3 = Aqua
  - 4 = Red
  - 5 = Purple
  - 6 = Yellow
  - 7 = White
  - 8 = Gray
  - 9 = Light Blue
  - A = Light Green
  - B = Light Aqua
  - C = Light Red
  - D = Light Purple
  - E = Light Yellow
  - F = Bright White
- **/e:on** – Enables command extensions.
- **/e:off** – Disables command extensions.
- **/f:on** – Enables file and directory name completion.
- **/f:off** – Disables file and directory name completion.
- **/v:on** – Enables delayed environment variable expansion.
- **/v:off** – Disables delayed environment variable expansion.
- **string** – Specifies the command you want to carry out.
- **/?** – Displays help at the command prompt.

Editing the Command Line

One of the frustrations of the command line is mistakes. When typing commands, it is easy to make mistakes, and in the past, command consoles have not exactly been

easy to maneuver around in. Cmd.exe gives you several keyboard strokes you can use to move around within the command line to fix errors and see what you have done. Try the options listed in Table B-1 when you are working with the command line:

TABLE B-1 COMMAND LINE OPTIONS

Option	Action
Up	Recalls the previous command in the command history
Down	Recalls the next command in the command history
PgUp	Recalls the earliest command used in the current session
PgDn	Recalls the most recent command used in the current session
Left	Moves left one character
Right	Moves right one character
Ctrl+Left	Moves left one word
Ctrl+Right	Moves right one word
Home	Moves to the beginning of the line
End	Moves to the end of the line
Esc	Clears the current command
F7	Displays the command history in a scrollable pop-up box
F8	Displays commands that start with characters currently on the command line
Alt+F7	Clears the command history

Common Commands

If you type **help** at the command prompt, you can see a list of common commands available to you, which are also listed in Table B-2. As mentioned previously, you can type any command with the **/?** switch to see all of the parameter options for that command.

TABLE B-2 COMMON COMMANDS

Command	Action
ASSOC	Displays or modifies file extension associations
AT	Schedules commands or programs to run on a computer
ATTRIB	Displays or changes file extensions
BREAK	Sets or clears extended CTRL+C checking
CALCS	Displays or modifies access control lists of files
CALL	Calls one batch program from another
CD	Displays the name of or changes the current directory
CHCP	Displays or sets the active code page number
CHDIR	Displays the name of or changes the current directory
CHKDSK	Checks a disk and displays a status report
CHKNTFS	Displays or modifies the checking of a disk at boot time
CLS	Clears the screen
CMD	Starts a new instance of the command console
COLOR	Sets the default console foreground and background colors
COMP	Compares the contents of two files or sets of files
COMPACT	Displays or alters the compression of files on NT File System (NTFS) partitions
CONVERT	Converts file allocation table (FAT) drives to NTFS
COPY	Copies one or more files to another location
DATE	Displays or sets the date
DEL	Deletes one or more files
DIR	Displays a list of files and subdirectories in a directory
DISKCOMP	Compares the contents of two floppy disks
DISKCOPY	Copies the contents of one floppy disk to another
DOSKEY	Edits command lines, recalls Windows commands, and creates macros
ECHO	Displays messages or turns echoing on or off
ENDLOCAL	Ends localization of environment changes in a batch file

Command	Action
ERASE	Deletes one or more files
EXIT	Quits the CMD.exe program
FC	Compares two files or sets of files and displays the differences between them
FIND	Searches for a text string in a file or files
FINDSTR	Searches for strings in files
FOR	Runs a specified command for each file in a set of files
FORMAT	Formats a disk for use with Windows
FTYPE	Displays or modifies file types used in file extension associations
GOTO	Directs the Windows command interpreter to a labeled line in a batch program
GRAFTABL	Enables Windows to display an extended character set in a graphics mode
HELP	Provides command line help information
IF	Performs conditional processing in batch programs
LABEL	Creates, changes, or deletes the volume label of a disk
MD	Creates a directory
MKDIR	Creates a directory
MODE	Configures a system device
MORE	Displays output one screen at a time
MOVE	Moves one or more files from one folder to another
PATH	Displays or sets a search path for executable files
PAUSE	Suspends processing of a batch file and displays a message
POPD	Restores the previous value of the current directory saved by PUSHD
PRINT	Prints a text file
PROMPT	Changes the Windows command prompt
PUSHD	Saves the current directory and then changes it
RD	Removes a directory

Continued

TABLE B-2 COMMON COMMANDS *(Continued)*

Command	Action
RECOVER	Recovers readable information from a bad or defective disk
REM	Records comments in a batch file
REN	Renames a file or files
RENAME	Renames a file or files
REPLACE	Replaces files
RMDIR	Removes a directory
SET	Displays, sets, or removes Windows environment variables
SETLOCAL	Begins localization of environment changes in a batch file
SHIFT	Shifts the position of replaceable parameters in batch files
SORT	Sorts input
START	Starts a separate window to run a specified program or command
SUBST	Associates a path with a drive letter
TIME	Displays or sets the system time
TITLE	Sets the window title for a CMD.exe session
TREE	Graphically displays the directory structure of a drive or path
TYPE	Displays the contents of a text file
VER	Displays the Windows version
VERIFY	Tells Window whether to verify that your files are written correctly to a disk
VOL	Displays a disk volume label and serial number
XCOPY	Copies files and directory trees

Appendix C

Helpful Windows XP Utilities

IN THIS APPENDIX

- Helpful software you can use

LET'S FACE IT; WE all love free utilities for Windows, especially those that do some cool things or make Windows XP run a bit better. I've scoured the Web in search of useful utilities and have found more than I can even list here, but I've narrowed the list down to a handful that I think you will enjoy using and should certainly try out. Keep in mind that Web site URLs change all the time, so if you have problems accessing a utility by the URL listed here, just search for the utility on the Web and you should have no problem locating it.

Ad-aware 5.71

http://download.com.com/3000-2094-10045910.html

Published by Lavasoft, this tool has the ability to scan your RAM, registry, hard drives, and any external devices that are likely to be used for advertising, tracking, and data mining from Web site ads and scripts. In a nutshell, this tool can help you maintain a greater degree of privacy while you surf the Web. The utility does a good job, and may even block some Internet tools you want to use, so some configuration may be required on your part.

Emergency Recovery Utility NT 1.0

http://download.com.com/3000-2094-10069122.html

This tool enables you to back up the Windows XP/2000/NT registry to a folder of your choice. Considering the registry backup features of Windows XP and the Windows XP Backup utility, you may not find this utility that helpful. However, if you want to back up the registry to a folder for easy storage, this tool works great.

FreeRAM XP Lite 1.03

http://download.com.com/3000-2086-10070530.html

From YourWare Solutions, this tool automatically monitors your memory and optimizes it. You can even get real-time information about memory usage and consumption on your system. With this tool, your system gets more freed-up RAM without compromising performance.

HelioBar XP

http://download.com.com/3000-2343-10069347.html

This little tool can free up your entire desktop by making the Start menu and taskbar transparent, revealing the entire desktop. This tool can be especially helpful if you are working with graphics and other programs where the taskbar and Start menu seem to get in your way.

SkinStudio 1.6

http://download.com.com/3000-2106-10058457.html

The SkinStudio program gives you the capability to create desktop overlays, or skins. Basically, the tool allows you to take images that you create with some other graphics program and put them together as your own interface. You can completely change the look and feel of Windows using this tool, and, overall, it is easy to use. You can even change task panes, title bars, buttons, icons, and so forth.

System Mechanic

www.wugnet.com/shareware

System Mechanic, shown in Figure C-1, is a great collection of tools that clean up, tune up, and make your system run better. A Windows Startup Manager feature and a Customize Windows tool even enable you to manage the startup, including programs and the overall look and operation of Windows XP. The tool also contains an Internet booster, which can help speed up the responsiveness of your Internet connection.

Figure C-1: System Mechanic.

XP SysPad

www.winxpfix.com/free-windows-utilities.htm

If you get tired of having to wade through the Control Panel to access different system tools, you'll like the XP SysPad. The SysPad is a launcher that gives you access to Windows system utilities. Essentially, this tool puts access to the utilities on the SysPad and you can launch them with a single click without having to move around through menus to access them.

TuneUp Utilities

www.tune-up.com

TuneUp Utilities optimizes the performance of your computer, fixes programs, and gives you the capability to further customize Windows. Overall, the utility can make Windows run faster and manage various aspects of your system, such as configuration, security, maintenance, and so forth. You can get the free trial version at the Web site.

MindSoft Utilities XP 7.5

www.mindsoftsite.com

The MindSoft Utilities XP 7.5 is a full maintenance package you should try out. You can defragment disks, fix common problems, make Windows run faster, and accelerate your Internet connection. An included ActiveMemory feature even makes your computer run as if it has more RAM. You can download a free trial version at the Web site.

Desktop Utilities

www.xdesksoftware.com

Xdesksoftware provides a number of helpful utilities that provide virtual desktop management, Notification Area management, file management, and several others. You can download shareware versions at the Web site and try them out.

SuperSpeed

www.superspeed.com

SuperSpeed is a RAM disk feature that writes data in memory to a portion of your hard disk, then retrieves it as needed by the operating system. You end up with a persistent RAMDisk that takes the place of physical RAM. The result is a faster running system. You can find out more about this product at the Web site.

MagicTweak 2.50

www.magictweak.com

MagicTweak (shown in Figure C-2) is an optimization and personalization program that helps you make Windows your own. Hundreds of tweaks are available that reconfigure hidden system settings in Windows XP and earlier versions of Windows. This software even optimizes your Internet connection and helps you manage startup items. You can get a free trial version at the Web site.

Figure C–2: MagicTweak 2.50.

Also, be sure to check out `www.tucows.com`, which is a major download site containing a number of Windows shareware and freeware utilities. Some of the items you'll find here are more helpful than others, but you'll find everything from system maintenance tools to digital photography tools.

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